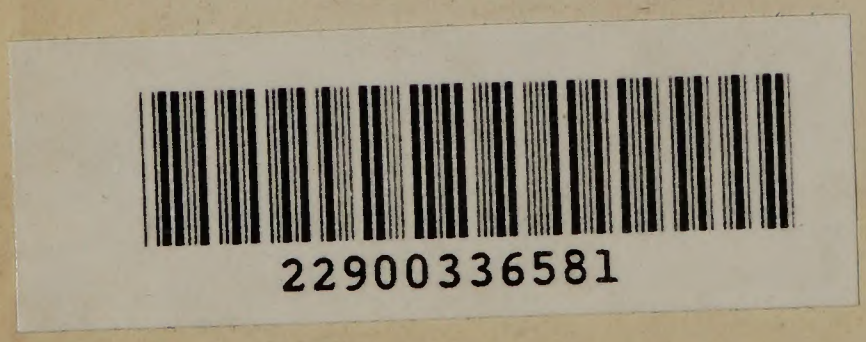
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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 941.] SATURDAY, JULY 7, 1888. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

NOTICES.

COUNCIL EXAMINATION PRIZES.

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Second Prize.—The Pharmaceutical Society's Medal in silver, and a present of books value £3, or thereabouts, given by Mr. T. H. Hills.

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The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held.

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OF THE

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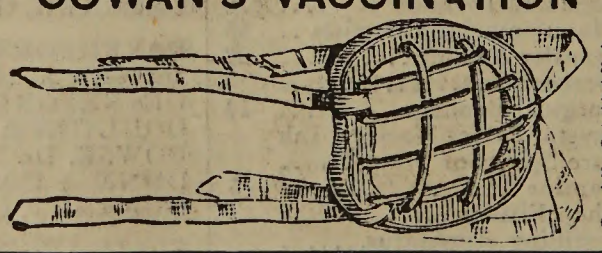

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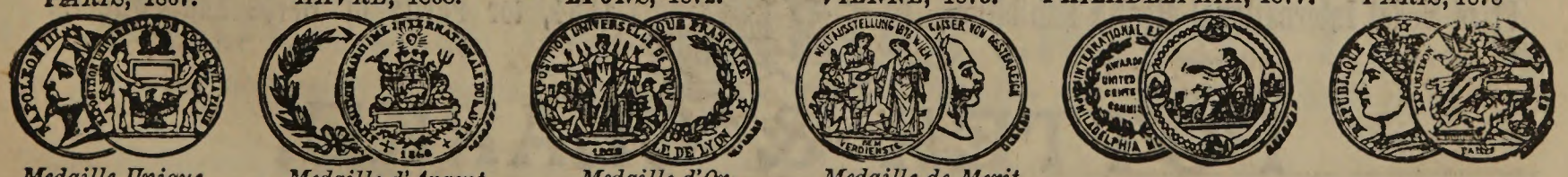

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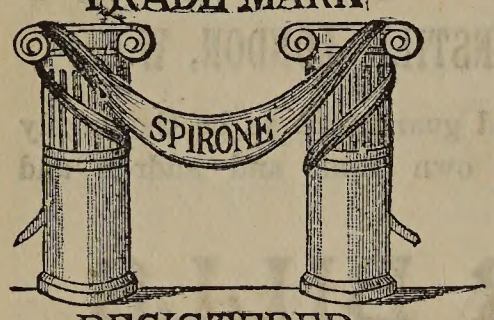

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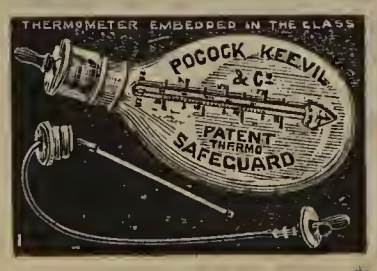

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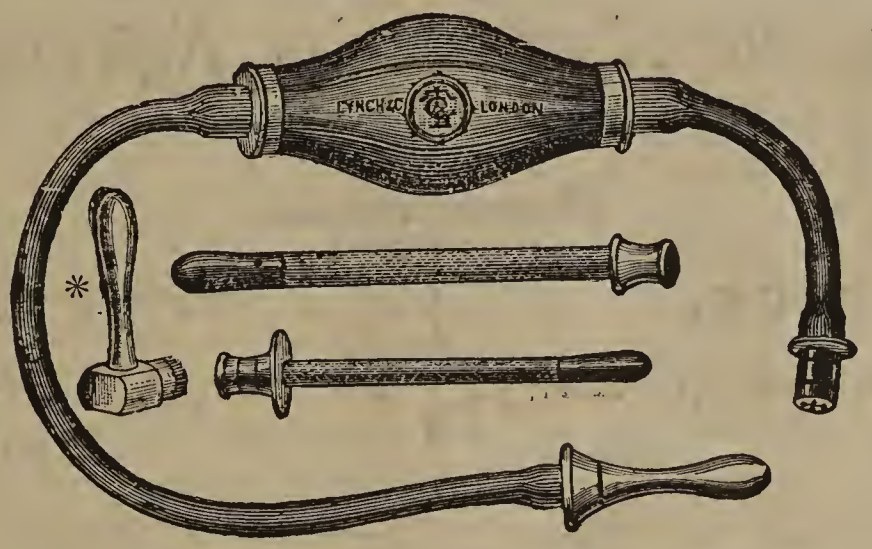

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The

Pharmaceutical Journal

AND

Transactions.

VOL. XIX.—JULY 7, 1888.

NOTES ON EAST INDIAN GUMS.

BY J. G. PREBBLE, BOMBAY.

During the last few years large quantities of gums, the production of Indian trees, have been exported from Bombay. About three-fourths of these exports go to the United Kingdom, and always I think to London, under the names of "ghátí," "amrad," "oomrawutty," etc. In a recent paper on these gums, published in this Journal,* these names and the origin of the gums do not appear to be well understood. Hence some notes on these points may be of interest.

"Ghátí," an aboriginal or purely Indian word, has the primary meaning of a strait or pass through a mountain. Drugs or vegetables of country or local production are sometimes distinguished as "ghátí" from those which are imported from foreign ports or from a distance; thus there is "ghátí-pitpapra" (*Justicia procumbens*), which is used as a substitute for the true pitpapra (*Fumaria officinalis*), imported from Persia, and "ghátí-mirchi" (*Capsicum annum*), country-grown chillies, as distinguished from a variety resembling the West Indian and imported from Goa and known as "gowar-mirchi,"† and lastly "ghátí" gum, gum collected on the ghats and hills of the country and called "ghátí" in contradistinction to the variety imported from foreign ports.

The best picked "ghátí" gum as now exported from Bombay is entirely or almost entirely derived from *Anogeissus latifolia*.‡ I think Dalzell is the first author who mentions this gum. He says, "the tree produces a very white, hard and valuable gum." The Bombay name is "daura" or "dabria." It is largely used throughout India for calico printing, for which it has a high reputation, and as has been shown by Mander it may with advantage be used in pharmacy in place of the high priced and scarce Kordofan gum. I have obtained the same reactions with this gum as was observed by Mander with a London sample of "ghátí" gum, hence I conclude that his sample was free from admixture with other gums.

"Oomrawuttee" gum derives its name from Oomrawuttee, or Amravti, the chief town of the Hyderabad assigned districts known as the Berars, the centre of a prosperous trade and officially described as "the very home of the cotton plant and the heart of the cotton trade in India." It gives its name to a variety of cotton staple, "the Oomrawutties," and such phrases as "good oomras," "good fine oomras," "oomra variety," are to be met with in the Bombay cotton market reports. Oomrawutti gum is considered by the native gum dealers in Bombay to be of two kinds, the "ghátí" and the "amrad;" the latter they consider to be derived from the babool tree (*Acacia arabica*). Babool gum is distinguished from all other gums that I have examined by being unaffected by either neutral or basic acetate of lead, and by being more or less darkened, but not gelatinized, by ferric chloride. Samples of babool gum that have hung long on the tree and are of a deep reddish-brown colour give a very dark coloration, almost black, but the pale samples are less affected. The Oomrawuttee sample examined by Mander was evidently babool gum. With regard to the name "amrad," I do not think it has any reference to "amra," the native name for the gum derived from *Spondias mangifera*, as this gum has a character more nearly resembling tragacanth than arabic gum. Forty grains of it form a jelly with about two ounces of water. I thought it might be a corruption of "amravti," but the gum dealers can give no satisfactory explanation of the meaning of the word further than that it is applied to all gums of a reddish tint. It is therefore probably a word imported into India, and as the name is principally applied to Barbary and Egyptian gums it may be a corruption of the Arabic word *hamrâ*, red, and this thought is supported by a statement I have recently seen that "amrad" is a corruption of "amhara,* a name applied to a gum derived from an acacia.

Gums are sent to Bombay from all parts of India, but the best come from Amravti. Other centres are Nagpur, Jubbnepur and Cawnpur, and a good deal is collected on the ghats of the Bombay presidency. On arrival in Bombay they are sorted by Cooly women and children. Anogeissus gum, possessing well-marked physical characters, is easily separated, and is sent to the London market almost free from admixture, but the dark coloured or amrad gums are generally mixtures of various gums, babool gum predominating. During the last financial year 20,895 cwts. of gum arabic of Indian production were exported from Bombay, valued at R7,93,934.†

* "Ghatti and other Indian Substitutes for Gum Arabic," *Pharm. Journ.*, April 14, 1888.

† Dymock, 'Materia Medica of Western India.'

‡ I consulted Dr. Dymock on this point, and he is also of opinion that the gum now exported as ghatti is derived as stated.

* *British and Colonial Druggist*, May 19, p. 539.

† 'Annual Statement of the Trade and Navigation of the Port of Bombay,' 1886 and 1887.

NOTE ON GINSENG.

BY JOHN HENRY WILSON,
Pharmaceutical Chemist.

There are five kinds of ginseng known in Shanghai, the Chinese wild ginseng ("yah-shan-shen"), the cultivated Chinese ginseng ("lean-tong-shen"), the Corean ginseng, the Japanese (called "tong-yang-shen"), and the American ("mei-kwoh-shen"), all of which are much used by the Chinese, as strengthening medicines.

With the exception of the American ginseng, all the above, as known in commerce, are the roots of *Panax Ginseng*. The American consists of the roots of *Panax quinquefolium*.

The most highly prized of all is the Chinese wild variety, "yah-shan-shen," for which fabulous prices are sometimes paid; as much as 60 taels (tael 5*s*.) is paid for a single root not larger than the little finger, the value depending in a great measure on the shape it assumes. Sometimes it is with the aid of a little imagination shaped something like the human figure, when it is especially valuable in the eyes of the Chinese. This kind, as can be imagined from its very high price, is very difficult to obtain, and it was some time before I succeeded in procuring the very typical specimen now in the Society's museum.

The Chinese cultivated ginseng, "lean-tong-shen," is next in value. The roots of this kind, if they were not scraped, would differ very little in appearance from the Corean. It is cultivated in the northern provinces of China and in Manchuria. It is grown in damp sheltered places on the sides of the mountains. It is, according to the 'Pen tso,' planted in the tenth month, and always gathered in the winter. The root is perennial and of slow growth, and not fit for use until it is five years old. When gathered the rootlets are cut off by means of a bamboo knife, iron or steel being carefully guarded against, as it discolours the roots. After the rootlets are cut off, the epidermis of the lower part of the root is scraped away. The roots are then spread out to dry in a closed place. This kind of ginseng is yellowish brown in colour, and where the epidermis has been removed it has a translucent appearance not unlike horn. When dried it is brittle, but at ordinary temperatures, and especially in a moist climate, it is soft, and can easily be cut with a knife. When dried and powdered the powder is very hygroscopic, attracting moisture very readily. The roots of this variety, as usually met with, are very much wrinkled and the epidermis is closely adhering to the fleshy part. Portions of the stem usually remain, from which it may be seen that they have been hung up to dry. The taste is sweet, very slightly bitter, and mucilaginous. It possesses a faint, but not by any means an unpleasant smell.

The Corean ginseng, of which there was a note in the *Lancet* of May 19, 1888, from "Life in Corea," differs very little from the above. The roots are left untrimmed, otherwise it would be difficult to distinguish them from the Chinese cultivated ginseng roots. They are of a light buff colour, the difference in colour probably being due to a different method of preparation, and more care being taken by the Coreans in drying them.

The epidermis of the Corean ginseng roots is thin and wrinkled, showing transverse rings, and the rootlets, which are not cut off, as in the Chinese ginseng, are thin and contorted. This kind of ginseng is highly esteemed and its value is enhanced by its size and shape. It commands a high price, but nothing like the price of the Chinese wild ginseng. It costs from 5 dollars to 10 dollars per catty or about 20*s*. to 40*s*. per pound.

The Japan ginseng, "tong-yan-shen," is entirely different in appearance from either of the above. As found in the Chinese druggists' shops, the roots are fusiform, hard, woody and of a pale yellow colour. The rootlets have been removed. The roots vary in size from 2½ to 5 inches in length. It is classified by the Chinese custom authorities according to size. That under twenty-five pieces to the catty is rated as second class. There is a considerable quantity of this imported into China from Japan.

The American ginseng, "mei-kwoh-shen," the roots of the *Panax quinquifolium*, is indigenous to Northern America, and is found in the middle and western states, from whence it is largely exported, and large quantities are imported into Shanghai every year. It is not at all like any of those described above. It is sent to China freed from its epidermis, or, as it is called by the customs authorities, clarified. The crude American ginseng, or that from which the epidermis has not been removed, is called "mei-kwoh-shen-shia," and is rarely seen now in China and has not been imported for some years. I had great difficulty in procuring a specimen of this crude ginseng, and a friend of mine in the Chinese Customs, to whom I am much indebted for information about Chinese drugs, had also considerable difficulty in finding it. The clarified ginseng fetching a higher price in the China market has caused the shipping of the crude article to cease. It is crooked, and varies in size from one to two inches in length, and is about three-eighths to half-an-inch in diameter, of a pale yellow colour, wrinkled and contorted. When the epidermis is removed, it has a smooth glassy appearance. The taste is sweet and agreeable, and it has a pleasant odour.

Judging from the quantity imported of Japanese, American and Corean ginseng into Shanghai, and of the quantity obtainable of the kind cultivated in China, not to mention the wild variety, which is monopolized by the wealthy Chinese, it is evident that there is a large consumption of ginseng in China, and this consumption has been going on for ages. There is no doubt but that they all possess strengthening properties and sustaining powers in a very high degree. It is an aphrodisiac, and is taken in cases of debility by all classes. There are few wealthy Chinese who have not a piece of the best kind of ginseng by them, carefully wrapped up in a small box, the small box often fitting into another. It is said, and was told to me by a very intelligent Chinaman, that it possesses most extraordinary life-sustaining properties, so much so, that the Chinese believe if a little of the root be grated, and the powder be placed upon the tongue of a person dying, it is capable not only of sustaining life for some time, but of keeping the intellect clear, so that the person is able to arrange his or her affairs before leaving this mundane sphere.

Be it as it may, there is no doubt about ginseng being a strengthening medicine, and there is little doubt about it possessing extraordinary aphrodisiac properties, and for the weakly and the worn out, from whatever cause, it is worthy of a trial in this country. And I shall be glad to supply any medical man *gratis* with a small quantity of either the

Chinese or Corean ginseng who may wish to give it a trial. It would probably be found most useful in cases of senile old age.

I am sending with these few notes on ginseng drawings of the different roots herein mentioned, drawn by a native artist; they are exceedingly well executed.* In the Museum of the Society are specimens of all the ginsengs, including the rare and expensive wild variety, which I had the honour of presenting to the Society in 1883, and when at home in 1885 I handed to Mr. Holmes, the curator, some microscopic sections of the different kinds of ginseng roots which were very kindly made and mounted for me by one of the learned Jesuit fathers of the Siciawei observatory, about two miles from Shanghai. I may mention I received many kindnesses and much information from the Jesuits, they being the authorities on scientific subjects of every description connected with China; some of them make ornithology, others botany, and others geology and conchology, a special study.

THE TREATMENT AND DISTILLATION OF PEPPERMINT PLANTS.†

BY ALBERT M. TODD.

"It has been claimed that the herb peppermint when freshly cut yields more oil than when dried. Is this so? And does the increased yield of oil compensate for the increased expense of shipping the fresh herb to the distiller?"

This question has long been a disputed one, and the discussions have attracted the interest of both scientists and manufacturers. That the importance of making a determination which would be satisfactory and final will be better understood, I will, before stating the results of my experiments, give a brief description of our novel industry, which is rapidly increasing in importance and proportions, prefacing the description with the single remark that distillation is effected with three-fold the rapidity from the dry rather than from the green plants.

There are now (in 1888)‡ cultivated annually in the United States (almost wholly in the states of Michigan and New York) over twenty thousand tons of peppermint plants, yielding over one hundred and twenty thousand pounds of essential oil, thus requiring on the average the production and handling of about three hundred and fifty pounds of plants in the undried state for a single pound of the essential oil. There are now in America about two hundred and fifty small distilleries where the crude or natural oil is produced, each distiller distilling, besides his own crop, the plants of about ten neighbouring growers on the average, making the number of persons engaged in the industry as principals over two thousand five hundred, beside a large number of workmen employed in the cultivation and distillation.

The distillers' charge for working up the plants of other growers has by custom been based upon the number of pounds of oil obtained rather than upon the quantity of plants, the present rate in Michigan being twenty-five cents for each pound of essential oil. This custom is most satisfactory to the grower, as he pays only according to his receipts, but it will be seen that it is not equitable for the distiller unless the plants are well dried prior to distillation.

The manufacturing system may be briefly noticed as follows:—The plants having been cut when in full bloom are drawn to the distilleries either with or without curing, according to the notion of the grower. The essential features of the distillery are first, a large boiler for the generation of steam; second, a pair of large wooden vats about six feet in height and of equal maximum diameter, which are connected with the boiler by steam pipes, which enter them at the bottom, (two vats being used so that one may be emptied and refilled while the other is running), third, a condensing apparatus, which consists of a series of pipes coated with pure tin, either with or without the ordinary "worm," over which cold water is made to flow continuously, this condensing apparatus being connected with the top of the distilling vat at pleasure by a duplex or "changing valve"; lastly, the receiver, in which the essential oil is collected, the ordinary form of which is a metallic vessel about twelve inches in diameter and three feet in height, from the bottom of which an exterior pipe leads to a height nearly equal with the body of the vessel. Recently I have constructed a much more efficient and elaborate receiver for rapidly separating essential oils both heavier and lighter than water; but as this paper is not intended as a technical treatise on apparatus it will not be described here.

About three inches from the bottom of the distilling vats are placed "false bottoms" containing many perforations, underneath which the steam enters from the boiler. Upon this perforated false bottom is placed a strong iron hoop having a diameter nearly equal with the vat, and supplied with heavy cross-bars. Two pairs of strong chains are secured to this hoop, meeting at the top of the vat in a pair of rings, one of which is fastened on either side of the vat at the top while it is being filled. This apparatus, as will be seen, is for the purpose of drawing the charge from the vats after distillation.

The apparatus being in position, the plants are thrown in by a workman with an ordinary hay-fork, while two or three others are engaged in "tramping them down." After the vat is about one-third full a small supply of steam is let in, which softens the plants and greatly assists in packing. When filled the vat is closed with a steam-tight cover, and the other charge being now distilled the entire amount of steam is turned on in the new one. The steam comes up through the perforations of the false bottom, and is diffused evenly through the plants. The oil is contained entirely in the minute cells in the leaves and blossoms. The action of the steam is two-fold. It softens the tissues of the oil cells and at the same time, by its heat, causes an expansion of the particles of oil, so that they burst forth from their miniature prisons, and are carried off with the current of steam. The steam, now charged with the essential oil, upon reaching the top escapes into the condensing apparatus, where it assumes the form of oil and water. Separation takes place in the receiver; the water being heavier sinks to the bottom, and is forced by the pressure from within upward and out through the exterior pipe referred to. The oil collects on the top and is dipped off at pleasure.

As stated, distillation can be effected with three-fold the rapidity from the dry rather than from the green plants, for the effect of drying is to soften the plants, allowing a larger quantity to be used for a charge, while such large charge can also be distilled in one-half the time required for a small quantity of green plants. But many growers, fearing that a loss of oil

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* The drawings have been deposited in the Herbarium of the Pharmaceutical Society.

† Read before the New York State Pharmaceutical Association in response to query. From an advance copy communicated by the author.

‡ During the past few years the consumption of peppermint has rapidly increased, so that statistics of production and distilleries now given show a marked increase over those given in my former papers on analogous subjects, which may be found as follows: In the 'Proceedings of the American Pharmaceutical Association' for 1886, page 121, and the *American Druggist* for September, 1886, page 161.—A. M. T.

results from drying, by diffusion in the atmosphere, cannot be prevailed upon to bring their plants to the distilleries other than in a green state. The extremes of difference which I have noticed are as follows :— From a charge of 2000 pounds of dried plants, well covered with leaves and blossoms, thoroughly dried, I have obtained 20 pounds of oil in thirty minutes, an hourly rate of 2 tons of plants and 40 pounds of oil; from a similar charge of very coarse plants, with few leaves and blossoms, distilled in the green state, less than 2 pounds were obtained, requiring one hour for their distillation.

Upon a clear day in September, in the middle of the day, two loads of plants were cut down side by side at the same time. Both loads were immediately raked up in the green state, containing all the natural juices of the plant, then drawn to the scales and weighed. One load was immediately distilled, the other load being spread upon the ground and dried for two days in the sun. At this time the plants had become freed from nearly every particle of moisture, the leaves being so dry and brittle as to break off quite readily in handling. This second load, which had thus been dried in the sun and open air, was now spread out in a loft and exposed to a further drying of the atmosphere for a little over six months.

The first charge of peppermint, which was distilled in the green state, weighed 2332 pounds, and produced 6 pounds 9 ounces of essential oil, being 1 pound of oil for each 355·35 pounds of plants, or 0·2814 per cent. After the second load had been dried and exposed to the atmospheric action as stated for a little over six months it was taken from the loft and distilled. I would say here that all the oil in the peppermint plant, as indeed in most, if not all, essential oil plants, is obtained from the leaves and blossoms. However, in distilling, the yield was more than 1 pound of essential oil for each 362·5 pounds of original green plants, which slight loss (about 2 per cent. in the amount of essential oil) is certainly to be accounted for by the portion of leaves and blossoms which rattled off in the re-handlings. The charge of peppermint, which was thus fully dried, had shrunk 49·4 per cent. of its original weight.

It will thus be seen that although the plants are very aromatic, both before and after cutting, there is no perceptible loss of the essential oil by the most thorough drying prior to distillation, the oil being so tightly sealed in its little prison cells that a force greater than that existing in the atmosphere or the rays of the sun is necessary to free it. Indeed, I have noticed that the leaves which fall from the plants in dry seasons and remain upon the ground over winter, even though subjected to rains and snows as well, are often found months afterwards to be so strong that one would hardly suppose that any of the strength had passed off.* It is known, though, in practical experience, that when the plants are once dried and subjected to rains, the water carries off a portion of the oil, acting in that respect as a slight distilling force.

It is not within the scope of the present article to treat of the chemical effect produced upon the oil by the action of the atmosphere, the tests of the oil, etc. Such determinations may be found by consulting the papers referred to in the note on the previous page. The principal results of the experiment recorded herein may be summarized as follows :—

First, in the treatment of peppermint and such other American essential oil plants as have been examined, no perceptible loss of essential oil by diffusion in the atmosphere is occasioned by a thorough drying of the plants prior to distillation in the open air at any ordinary temperatures.

Second, when the drying of the plants is continued for many months, a slight oxidation of the oil in the leaf occurs through contact with the oxygen in the air, decreasing its solubility and increasing its specific gravity, also raising its boiling point through the formation of a non-volatile and insoluble resinoid produced by oxidation.

Third, a long exposure of the plants to atmospheric action prior to distillation, does not perceptibly affect the crystallizing tendency of the essential oil, nor other of its physical tests except those noted, as far as investigated.

Fourth, to obtain the best results, both as to the quality of essential oil and economy of transportation and manufacture, the plants should be dried as thoroughly as possible without endangering the loss of the leaves and blossoms in handling. Distillation should then take place as soon as convenient to prevent the oxidation of the oil in the leaf by atmospheric action.

* Since writing the above, I notice a paper by Mr. Joseph Schrenk in the *American Druggist* for June, 1888, which corroborates the determination given in the above paper. Speaking of the crystals in the leaves of plants which have been dried for fifty years, he says : "It is remarkable how long these crystals will remain in the dried leaves. Fragments from an herbarium specimen gathered in Europe in 1827 contain them in as perfect a condition as leaves of plants collected quite recently."—A.M.T.

BAHAMA SPONGES.*

BY FREDERICK STEARNS.

The readers of the *Era* will share, I am sure, the interest I have taken during a winter stay on the Bahama Islands in the sponge-fishing business, by far the most important industry pursued in the colony.

I have enjoyed the rather unique experience for a tourist, of a month's cruise in a sponge vessel, over one of the most extensive of the sponge banks, lying westward of the Island of Andros, and the largest of the group. My voyage was for health, recreation and observation, and was fruitful in a collection of many interesting forms of marine life as well as affording to me a clear insight into the sponge-fishing industry.

The Bahamas form, as most of your readers are aware, an extensive group of low islands south-east of the United States, the Gulf Stream flowing north-easterly between Florida and these islands.

The Bahamas cover a very large area containing about forty large islands, nearly seven hundred Cays (or Keys, generally rocky islets of from fifty to several hundred acres extent), and several thousand rocky heads and sandy bars.

These generally rise out of vast areas of submerged plateaus of soft calcareous rock, covered either with white marl-like clay, mud, or with sand.

These plateaus are called banks—the Bahama Banks—and upon them the sea ranges from the depth of a few inches to that of two, three, and even to five fathoms. These banks either surround, or lie off one shore of each island, varying in width from two to three miles to eighty or one hundred miles.

Edging these banks and where the water suddenly takes on deep soundings, of from one hundred to six hundred fathoms, there exist often coral reefs, upon which the surf ever breaks, and through which at considerable intervals channels open deep enough for the small vessels to enter upon the banks.

Deep abyssal tongues of the ocean run in between the islands and their surrounding banks of from thirty to forty miles wide to a length of a hundred miles or more.

The Bahamas form a vast breakwater from the violent North Atlantic, completely land locking with the windward islands or Lesser Antilles the Caribbean Sea and the Mexican Gulf, and they form the eastern shore of that great river in the sea, the Gulf Stream. The Gulf Stream in return enfolds the Bahamas with never ending

* From the *Pharmaceutical Era*, May.

summer airs. The blizzards of our northern States, which as northers chill in Texas and Louisiana, and frost-bite the orange groves of Florida, are robbed of all that in crossing the Gulf Stream. The temperature at Nassau for the four months of December, January, February and March is 71° F. at 7 o'clock a.m., 75° at noon, 73° at 6 o'clock p.m., and from this the variation is not over 5 per cent.

It is, however, with the Bahama sponge banks that we are interested at the present writing. These *white* waters, as they are called, spread over thousands of square miles, shallow, averaging about twelve feet, extremely clear, the tint being of that exquisite and delicate green in the beryl gem called "aqua marine." The floor or bottom is white or cream coloured mud, a marl or clay, at intervals sand. Very shallow banks occur frequently, sometimes miles in extent, uncovered at low tide and only two or three feet under water at any time. The water over these at a distance reflects back from a bright, deep turquois blue to one almost black. Where the beds of grass and sea-weed abound the water seems black. The experienced pilot of these waters can tell you at a distance the depth, the character of the bottom, from the colour of the water, or if it be only cloud shadow.

No words can convey adequately the impression of beauty made by these beryl-green seas dancing in the soft breezes. As they rest in the morning calms their transparency is marvellous, under the vessel the white floor is spread, as in a marine garden, and you seem to hang over the edge of a cloud looking at fishes, sponges, coral, waving sea-feathers and fans, giant star fish, the big strombus—ploughing his way along, and at many another thing of life.

It is upon these banks the sponge is at home. In the living state a sponge is as much unlike the article of the drug store as it could well be. It has the general form, to be sure, but a fair comparison would be a sponge fresh dipped in tar, so shining black is it. Its surface covered with a jelly or soft leathery integument, or sarcode, which penetrates some distance into the substance of the sponge; this is the animal part of the sponge. The sponge of commerce is only the corneous skeleton of the creature as landed on deck by the dexterous twist of the wrist and hook of the sponger. It is solid and plump with water, and will hold much of it as long as living. If squeezed hard the water flows from the large apertures only, or only very little from the small ones, and not at all through the sarcode.

There are sponges, *and* sponges. Those on the Bahama Banks number only seven species that have commercial value. These in commerce bear the following names, the value of the first-named being greatest and that of the others decreasing in the order named :—(1), sheep's wool; (2), velvet (or boat); (3), reef; (4), grass; (5), yellow; (6), glove; (7), hard head.

The colour of these sponges when cured varies from light dun yellow of the sheep's wool to a dull reddish-brown of the hard head. The most valuable size is that of a man's head in all species, save reef, and in that one, the size should be 2 to 3 inches diameter.

Aside from these species I would hardly dare to estimate under the species which exist apparently on for existence sake, so numerous are they, certainly they number hundreds. I have already collected over fifty species. Many of them are very beautiful while living, in form and colour. Some have a sarcode of scarlet or purple, dull yellow or gold; in some the form is disc-like, flat; some branch like corals; some are long hollow whip-like tubes, some groups finger-like, some like organ pipes clustered, some cup shape, some mushroom-like, some helmet form, and so on.

Often I have hooked large masses of branching sponge, upon which would be living in perfect comfort a number of other species, not even poor relations, as they bore no likeness to the central mass. Others would be full of holes and corridors all occupied, a whole colony of marine boarders taking rooms, but *finding* themselves. Spiny black sea eggs, an olivella shell in its purple mantle—probably on the first floor—three species of star fish, little gimlet-like vermetus shells, tiny bright coloured fishes, little moss-backed crabs so disguised by a growth of Algæ that they would pass unnoticed if they did not attempt to escape, other species of black, white and red crustaceans tiny as a fingernail, while nestled in the top opening of one sponge I found an octopus—mother and children doing well. The outfitting of vessels and collecting of sponges is as follows :—

The outfitters of the sponge fishing boats are persons in Nassau, the capital of the Bahamas, and the only settlement of any importance. These may be, and generally are, merchants dealing in provisions and other necessaries of life, men of considerable means acquired in sponge trade.

The vessels are built of pine and framed of hardwood, generally horse-flesh wood, a species of mahogany. They are from 25 to 40 feet long, schooner rigged, though a few are sloops, tonnage 7 to 20 tons; life of such vessels with care twenty to thirty years. Never insured, many are lost in storms and particularly in hurricanes, though they mostly go out of commission in the hurricane months, viz., August, September and October. Voyages last from four to six weeks. The number of vessels in the trade is variously estimated at four to five hundred, a few owned by the captains, very few sailed by whites, but generally by a coloured crew. The number of men employed is from two to three thousand, which number is decreasing slowly, owing to the poor returns to the men, and the call for men on the Panama Canal. Cost of vessels equipped is from 900 to 1500 dollars, all of which is advanced by the outfitter or owner. They sail with stone ballast as the return cargo is light. A bulkhead divides off a small cabin aft, the galley is simply an open box on deck filled with ashes, the fuel, dead button wood or mangrove, gotten off the Cays. Utensils for cooking: a pot with an iron lid for baking bread, a skillet, a frying-pan and coffee-pot, tin plates, iron spoons, no knives or forks, the sailor's belt knife takes the place of those. The food, bread and water only, or, for a change, water and bread.

Occasionally a mess of fish or of shell-fish may be caught, but "dry vittles" is the rule, bread and water or a little coffee without sugar or milk.

The outfitter sends the vessel with a black crew of seven or nine men, with three or four small boats called dinkeys. He furnishes the flour, baking powder, salt, matches, kerosene, tar, a little bacon or lard and grits (or hominy). The crew includes captain, mate, cook, and crew of spongers from four to six.

The fishing banks are reached in from one to two days' sail. The vessel anchors, and the crew, except the cook, take to the small boats, two men to each for sponge collecting, one man, the smaller or weaker one, poles the boat slowly along, never rows it, the other, generally a big-necked brawny fellow, hangs over the starboard gunwale, with a water glass in his left hand and a sponge hook in his right. The water glass is a square (or round) bucket-like vessel with a thick plate-glass bottom; this placed on the surface of the water stills it so that one can see the bottom as plainly as one can see things through a window. The hook is of iron and like a two-pronged fork bent at its middle at an angle of 45°; this is 6 by 3 inches, and is hafted to a pole of pitch pine 1½ inches in diameter, and from 12 to 30 feet long according to the depth of water.

As the boat is poled slowly along and the sponges come into view, the man with the hook reaches for each and dexterously hooks underneath, tearing it from its slight anchorage and landing it in the boat. They work from sunrise until dark, the cook meanwhile cooking, and sailing the vessel round among the small boats, to give the spongers food and to take off the sponges as the boats get loaded.

When the deck of the vessel is piled full of live sponges, and under exposure to the sun, the animal part dies, and then they bleed, as it is called, and the dead matter begins to drip away. The living sponge gives off an odour suggesting iodine and not offensive, but the dead sponge is rather "loud." Then the vessel with its deck load of dead sponges sets sail to a point near some cay or shallow shore, where a "crawl" has been previously established, and which is the exclusive property of this boat.

This crawl is simply a sort of wattled fence of faggots or short poles strengthened by weaving in basket-like supple twigs. It may be square, oval, round or oblong from 6 to 16 feet square, and at low tide must have at least 1 foot of water in it. These crawls are always built in the lea of some shore or island protected from the prevailing winds. Into the crawl the sponges dead and unloaded from the vessel near at anchor by the small boats are thrown, and the vessel sails back on to its fishing ground for more sponges. The tide meanwhile swashes to and fro through the crawl and sponges, and in a week's time all the dead animal matter is washed out and the sponge looks as we see it in the stores. When enough are collected to fill the hold of the vessel, or time is up, or provisions exhausted, the sponges are taken ashore from the crawl, pounded to remove sand, clay and water, piled up to dry, and finally placed in the hold and the vessel sails direct for Nassau and market.

(To be continued.)

THE MANUFACTURE OF LITHIUM SALTS FOR MEDICINAL OR TECHNICAL PURPOSES.*

The element lithium is one of those which are widely distributed and occur in many localities, but only in a few places in such quantity that its extraction becomes profitable. Its most abundant source is the mineral *lepidolite*, consisting of silicate of aluminium and fluorides of alkalies, among them also lithium, which amounts to about 3 per cent. of the total constituents. The most abundant deposit of this mineral which is easily accessible, is a layer, occurring between granite and gneiss in the mountain of Hradisko, near Rozena, in Moravia (Austria). Lithium occurs also in some other minerals, up to about 7 per cent., but these are of too rare occurrence to serve as sources of manufacture. Many mineral waters contain lithium, but mostly in very small quantity. Some of them, however, contain a sufficient amount of it to warrant their employment as forms of administration of lithium for medicinal purposes. There are several valuable springs of this kind in the U. S., for instance, one at Ballston, another near Buffalo, and one in Virginia. The Mur-spring at Baden-Baden contains 0·2952 gm. (about 4·9 grains) of chloride of lithium in the litre, and a hot spring in Cornwall (England) is said to contain 0·372 gm. (about 6 grains) per litre, the total quantity of water produced in *one* day containing about 300 kilos of the chloride of lithium. Lithium has also been discovered in the ash of many plants, in the blood and milk, and in other substances.

The general method of preparing lithium salts from the crude minerals consists in decomposing the latter by acids, or, if this is impracticable, to fuse the mineral with lime and extracting the mass with water. The resulting solution is then freed from all bases except alkalies. And the usual method formerly practised for separating the lithium from the other alkalies was based upon the slight solubility of carbonate of lithium in water, compared with that of the carbonates of the other alkalies. If a concentrated solution of an easily soluble lithium salt (for instance, the chloride) is mixed with a solution of carbonate of sodium, or potassium, or ammonium, carbonate of lithium is precipitated. There is, however, some lithium left in solution, and, besides, the precipitated carbonate of lithium contains a considerable proportion of the carbonate of the alkali used for precipitation. Sometimes the precipitate appears to have been put on the market without further purification, and hence the complaints which have recently been made by some French writers that the commercial salicylate of lithium, received from Germany, is contaminated with salicylate of sodium. The precipitate above spoken of can only be deprived of the accompanying alkalies by repeatedly dissolving it in hydrochloric acid, precipitating with carbonate of ammonium and pressing. When chloride of lithium occurs in the solution alone with chloride of sodium, the two may be separated by alcohol or a mixture of alcohol and ether, which dissolve the former, but not the latter salt.

As *lepidolite* is the most common mineral of lithium, though occurring only in a few localities, it is usually employed as the source of the commercial lithium salts.

According to Cooper, this mineral contains only 0·7 per cent. of lithia and 0·99 per cent. fluoride of lithium; according to other authorities, the lithium amounts to about 3 per cent.

There are probably some localities in the United States where this mineral occurs, but so far we have not heard of any place which affords it in sufficient quantity, and readily accessible.

Among the processes employed on the large scale for extracting the lithium from the mineral, the following method, used by E. Schering, of Berlin, is the best. It is based upon that of Joss, which is briefly as follows: The elutriated mineral is digested for some time with concentrated sulphuric acid in stone-ware vessels. The excess of sulphuric acid is afterwards driven off by heat, the mass extracted with water, the solution precipitated by ammonia (which separates alumina, silica, iron, etc.), the filtrate from this evaporated to dryness, and the residue ignited. The latter consists of alkali sulphates which are separated by alkali carbonates.

In Schering's factory this method is modified in the following manner:—

The mineral, lepidolite, is finely powdered and sifted, transferred to a basin of stone-ware situated so as to be surrounded by warm air, then mixed to a thin magma with concentrated sulphuric acid, and digested until the mass becomes lumpy. It is then calcined on a hearth, and, while still warm, completely lixiviated with water. Before the resulting solution is evaporated, it is mixed with enough sulphate of potassium to combine with the aluminium present to alum. During the evaporation, the latter separates as a fine precipitate, which is removed, and any alum that may finally remain in solution is decomposed by milk of lime. After filtering and washing the united liquids are mixed with chloride of barium, whereby all the bases present are converted into chlorides, while sulphate of barium falls down. The whole mixture is then evaporated to dryness, and the residue extracted with absolute alcohol, which dissolves out the chloride of lithium and chloride of calcium. After removal of the alcohol (which is, of course, recovered), the calcium salt is decomposed by oxalate of ammonium, and if any contaminating metals should still be present, these are gotten rid of by sulphide of ammonium. The filtrate is again evaporated to dryness, once more extracted with absolute alcohol, and, upon the removal of the latter, almost absolutely pure chloride of lithium is left behind.

To convert this into the carbonate, which is the starting point for all other salts of lithium, it is dissolved in a small quantity of water, and precipitated by carbonate of ammonium and water of ammonia. The resulting carbonate of lithium is finally washed with alcohol of 60 per cent., whereby the remaining traces of chlorides may be removed.

* From the *American Druggist*, April.

The Pharmaceutical Journal.

SATURDAY, JULY 7, 1888.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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THE SOCIETY OF CHEMICAL INDUSTRY.

THE Society of Chemical Industry, in accepting the invitation of the Scottish section to visit Glasgow this year, secured once more a rendezvous in a district that is particularly rich in illustrations of applied science. Alkali making, the manufacture of ferrocyanides and chromates, iron smelting with the most recent contrivances for the utilization of the tar and ammonia obtainable from furnace gases, Turkey red dyeing and calico printing in their intimate relations with one of the most marvellous developments of synthetic chemistry, shale distillation and sugar refining, will suffice to mention as instances of such manufacturing industries carried on in Glasgow and its neighbourhood. In recent years some of these have been revolutionized by the substitution of processes based upon the results of scientific investigation for the old rule-of-thumb modes of working. In most of these instances, so far as chemistry is the science that has received application, it is seen principally from what might be termed its physical aspect. It was this fact that probably influenced, and certainly made specially appropriate, the eloquent address delivered on Wednesday morning last in the great hall of the University of Glasgow to the members of the Society by the President, Professor DEWAR. The keynote of that address, it may be said, is to be found in the reference to Dr. BLACK'S abstention from the use of terms involving hypothesis and his description of prelections on what would now be termed "chemistry" as lectures on the effects of heat and mixture. With considerable freshness of illustration the speaker traced a connected line of work dealing principally with the relation that exists between the physical conditions to which ultimate particles—or masses of ultimate particles—are subjected and their behaviour and the form they take. This view of so-called chemical action is in these days rapidly assuming greater importance, while it is drawing chemistry into closer and more homogeneous relations with the other physical sciences. It was therefore excusable and apposite for Professor DEWAR to call attention to the influence exercised by his own countrymen in bringing about this result. His argument and illustrations afford another proof of the fact that every fresh truth discovered and promulgated is a step in advance, whether its exact bearing and relation to other truths is at the time perceptible or not; for almost the first work referred to by him had its origin in a cosmical—if not a theological—dispute, rather than in a special intention to promote chemical science.

The large and influential gathering that listened to and endorsed by their applause the remarks of Professor DEWAR in the University of Glasgow on Wednesday, and the fact that the members of the Society of Chemical Industry now number considerably over two thousand, form an indisputable justification of the existence of the Society. If the Society did nothing more than educate the people of this country to the perception that manufacturing pre-eminence can no longer be looked upon as their inalienable possession a valuable service will have been performed. But it is doing and will do much more. By its sectional organization for gathering up information as to the application of science to the manufactures of particular districts throughout the kingdom, and by the publication of this information in its journal, it is assisting in placing at the disposal of British manufacturers those services and methods which alone will enable them to compete with rivals who have shown more alertness in yoking science to the wheels of trade. As representing a calling that perhaps to a greater extent than any other has in the past contributed to the advance of science whilst improving the manipulation of its wares, we wish a full measure of prosperity to the Society of Chemical Industry.

It was also opportune for the Society that its visit to Glasgow was coincident with the very successful exhibition that is now open in that city. In that exhibition there are many displays that will prove interesting to all who are connected with the applications of chemistry to manufactures. It is singularly poor, however, in strictly pharmaceutical exhibits; but nevertheless we hope to describe in an early communication several that appear to us to present points of interest to pharmacists.

HYDROPATHY: ITS PLACE IN MEDICAL SCIENCE.

IN an article under this heading in the current number of the *Practitioner*, by Dr. E. SYMES THOMPSON and Dr. C. F. GRINDROD, the authors refer to the utility of health resorts in the treatment of many varieties of chronic disease which possess the common characteristic of being beyond remedy by drugs alone, and they point out that in our country there are many excellent spas in no way inferior to those on the Continent, where skilful treatment under the influence of local conditions affords a means of accomplishing what is needed. Among the conditions which are concurrently effectual in this direction, climate and

the properties of the air or water at different places are no doubt of much importance, but the change in the mode of life of patients visiting health resorts is also a potent remedial influence. In this respect the authors suggest that the success of bath treatment depends less upon the mineral ingredients of the water drunk or bathed in, the temperature of baths, or the time of their application and the length of the "cure," than it does upon the precision with which the treatment is conducted and the skill with which it is adapted to the characteristics and needs of the patient. In their opinion a skilful medical man may do more with a comparatively inert water than a "routinist" with a most potent and appropriate spring.

The authors illustrate their position by reference to the case of a patient with all the symptoms of long-standing dyspepsia. To give him a tonic is but spurring a lame horse. He cannot sleep, and to give him opiates is but masking the mischief. What he wants is "a complete change of life, and for a sufficient length of time, fresh air, regular dieting, and a system of baths which by acting on the skin will help to relieve the disordered organs of digestion, and by acting on his nerves will give these same digestive organs a good start for better running. Now these conditions for reviving health can best be found at a hydropathic establishment, that is to say, in some locality specially chosen for this object, and under the charge of a doctor who has the means and leisure to devote to this special treatment. Though generally successful in its own domain this mode of treatment cannot be said to be a rapid one, and medical advisers sometimes forget, when recommending an old dyspeptic to try 'a week or two' at a sanitorium, that if 'Rome was not built in a day' it cannot be rebuilt in a week. Like other complaints dyspepsias differ in kind and in degree. Your 'man about town,' with a good frame to start with, who has got an acute bite of the disorder, the result of dinings out and sundry other indiscretions, though he deserves it not, often rapidly gets the better of his punishment, and emboldened by the process perhaps henceforth devotes one month out of the twelve to wooing back the *tone* which the other eleven have taken from him. But the chronic dyspeptic, the 'nervous dyspeptic' of our time, is the product of a life of work, worry and waste, and it is not too much to ask for two or three months in which to undo the ravages of years."

These remarks have a bearing upon the suggestion lately made in this Journal with the view of directing increased attention to the utilization of British health resorts, and they indicate the means by which that result may be attained. There are many home-loving invalids, who before trying Carlsbad and Kissingen are inclined to ask whether the waters of Harrogate, Woodhall and Malvern might not be as effectual for their purpose, and so far as baths are concerned, there is every reason for believing that they can be obtained with even greater perfection and luxury at Bournemouth than at Mont Dore. At the same time it must not be forgotten that one essential for securing success is the complete removal of the ordinary cares and habits of home life. It is the complete removal of these environments for a time that is so valuable to many and such an indispensable preliminary to medical treatment. In connection with this desideratum too much stress cannot be laid upon the importance of cheerful and congenial surroundings. Foreign health resorts present great advantages in this respect by reason of the novelty of a foreign land, of speaking another language, seeing new sights, and in various other ways experiencing new phases of thought. A sense of the necessity for providing cheerful distraction of this kind at British health resorts is being awakened, and they are every year being made to offer greater attractions. With still greater advances in that direction many of our health resorts might be rendered superior in their advantages for curative treatment to those of the Continent. One important point is that they are more easy of access, and can therefore be easily reached even at a time of the year when a long journey on the Continent would be undesirable. The significance of this is evident, since it is the fact that ordinary cases suited for hydropathic treatment in England derive as great advantage in winter as they do in summer. The common notion that water treatment is best practised in the warm season of the year is a mistaken one, and as the author of the paper points out, experience proves that if there be any choice the reverse is true, except in very delicate cases, for it is easier to regulate the temperature for baths in cold weather than in hot, while in very hot seasons the important tonic influence of both air and water is wanting. Many patients who are sent abroad are more in want of quiet rest than of anything else, and they are irritated and depressed by the excitement of change and travel instead of gaining the healthful effects hoped for. Moreover, sanitation abroad is far behind what it is here, and in the South, as Dr. King Chambers has pointed out, acute disease takes the place of the chronic disease of the North, so that patients not unfrequently make a bad exchange for what they sought to remedy by encountering typhoid or malarial fever. The paper we have here referred to offers, therefore, many reasons for the desirability of developing British health resorts, and increasing their attractions as places where the system of curative treatment that is now so popular may be carried out more extensively. As we have before suggested, it is possible for pharmacists resident in such localities to take part in this work with much advantage in various ways.

It may be useful to call the attention of pharmaceutical chemists who have passed the Major examination during the past session to the official notice on the front page as to the Council Examination Prizes, for which, if they were Associates of the Society at the time of passing that examination, they are entitled to compete. The prizes are the "Pereira Medal," with books to the value of £5; the Silver Medal, with books to the value of £3; and the Bronze Medal, with books to the value of £3. The examination is to be held in London and Edinburgh on Monday, the 23rd inst., and notice of intention to compete must be given to the Secretary at least five days previously.

* * *

On another page will be found the clauses referring to the registration of trade marks which occur in a Bill that relates to the whole subject of Patents, Designs and Trade Marks, which has just been introduced into the House of Lords with a view to the amendment and consolidation of the law on the subject. Most of the alterations in the existing law proposed in this Bill are based on the recommendations made by Committees appointed by successive Presidents of the Board of Trade and presided over by Lord Herschell, the latest report from which was referred to in these columns a few weeks since. It does not seem very probable, considering the late period of the session and the state of public business, that the Bill will stand much chance of being passed before the rising of Parliament, but some advantage will be gained by having an opportunity for quiet consideration of the proposed provisions as to their probable effect should they become law, and as a large number of our readers are interested more or less in the proper protection of trade marks, it has been thought advisable to reproduce the clauses in the Bill relating to this particular subject. The most important alterations of the existing law in this respect appear to lie in the new definition of what shall constitute a trade mark entitled to registration under the Act. There is also a new provision to the effect that if an applicant for registration abandons his application after notice of opposition has been entered he shall be liable to the costs incurred in the opposition, and another extending the operation of the Act to the Channel Islands.

* * *

We understand that at a recent meeting of some of the members of the Pharmaceutical Conference in Newcastle-on-Tyne, Mr. B. S. Proctor, F.I.C., kindly consented to act as Hon. Sec. *pro tem.*, to summon a meeting of the members of the Conference and the trade in the district at an early date to discuss the question of inviting the British Pharmaceutical Conference to visit Newcastle in 1889.

* * *

The Pharmacy Act (Ireland) Amendment Bill was on Tuesday read a third time in the House of Lords and passed.

* * *

The next botanical excursion in connection with the Edinburgh Chemists' Assistants and Apprentices' Association is to take place on Wednesday evening next, the 11th inst., the destination being Arthur's Seat and Duddington Loch, and the start being made at 8.30 from Holyrood.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, July 4, 1888.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Allen, Baildon, Cross, Evans, Gostling, Greenish, Hills, Martin, Newsholme, Nichol, Richardson, Robbins, Savage, Schacht, Southall and Symes.

The minutes of the previous meeting were read and confirmed.

The Retirement of Mr. Radley and Mr. Woolley.

The PRESIDENT said he had to apologize to the Council for having omitted last month to bring forward two resolutions which he knew it was expected he would do, but which he had somehow overlooked, recording the sense of the Council as to the services of Mr. Radley and Mr. Woolley. He had written to both those gentlemen and made his apologies to them, and would now bring forward the resolutions. The first was:

> "That this Council desires to record its sense of the services rendered to the Society by Mr. W. V. Radley as a member of the Council for eleven years and for so many years as Local Secretary for Sheffield. The Council begs to assure Mr. Radley that he carries with him in his retirement the best wishes and kindliest recollections of all his former colleagues."

Mr. Radley was well known to a large number of members of the Society, and members of the Conference; and he was one of the founders of the Society, of whom there were not many now left. He was one of those men who in early days did good work for the present generation of pharmacists and chemists and druggists, and whose work was sometimes forgotten by younger men. They therefore owed a debt of gratitude to Mr. Radley, not only for his assiduity and attention as a member of the Council, but also for acting as Local Secretary, and keeping up kindly feelings in Sheffield in early days when the Society was in a struggling condition. Members of Council must all feel some regret at losing the services of a gentleman of so much common sense and practical knowledge; but still they must all agree that having fought the good fight for so many years he might now be allowed to retire from duties which involved a good deal of hard work, and take a reasonable amount of leisure.

The VICE-PRESIDENT was very happy to second the resolution, and expressed his entire concurrence in everything the President had said.

The motion was carried unanimously.

The PRESIDENT then moved—

> "That this Council desires to record its high appreciation of the services rendered to the Society by Mr. G. S. Woolley during the ten years he was a member of this Board, and trusts that on some future occasion he may find it practicable to place himself at the disposal of the Society as a Member of the Council."

While it was due to Mr. Woolley that his services should be placed on record, he was bound to say personally that he still expected something more from him. The number of men who took an active part in pharmaceutical life was, for many reasons, not great; and those who had the position, ability and energy, and who represented certain districts in the country, ought not, it seemed to him, to be allowed to let their energies lie fallow too long a time. He had reason to believe and hope that at some future time, when the immediate pressure of business was not so great, Mr.

Woolley might again allow himself to be nominated for the Council. He had given him a polite hint to the effect that the Council and the Society expected him to do something more later on. It was interesting to know that all Mr. Woolley's family from a very early day had taken an active interest in the Pharmaceutical Society; his father before him, his brothers, he himself and his son, who was now at work in the Research Laboratory. Ever since the foundation of the Society the name of Woolley, of Manchester, had been known throughout the trade and highly respected; and Mr. George Woolley had, if anything, increased the respect with which that name was received amongst pharmacists, and he regretted very much his retirement, though he hoped it would only be temporary.

The VICE-PRESIDENT, in seconding the resolution, said he did so with pleasure, but his own feeling was that the Council might have reserved this expression of thanks to Mr. Woolley until he had completed his services some years later. However, as a different view was taken generally, he was most happy to second the motion.

The motion was carried unanimously.

DIPLOMAS.

The following being duly registered as Pharmaceutical Chemists were respectively granted a diploma stamped with the seal of the Society:—

Ashfield, Armishaw.
Davies, James John.
Forster, James Beaty.
Harrison, Richard Casswell Clark.
Hoare, William Herbert.
Muskett, Frederic James.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following having passed the Major Examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Ashfield, Armishaw .....Stratford-on-Avon.
Harrison, R. Casswell Clark ...London.
Hoare, William Herbert.....London.
Muskett, Frederic James .....Attleborough.

Chemist and Druggist.

George William Shrubsole, of Chester, who passed the Minor Examination, and who was in business before August 1, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society.

ASSOCIATES IN BUSINESS.

The following, having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Brooks, John .....East Ham.
Hoare, William Parker .....Cromer.
Matthews, Henry Paget.....South Ashford.

Modified.

Duff, William .. ..Edinburgh.

ASSOCIATES.

The following, having passed the Minor examination, and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Allan, Alexander.....Aberdeen.
Baxter, George Munnerley ...Chester.
Boxall, Frederic .....Horsham.
Browne, Frank .....Northampton.
Butcher, William Frederick...Blackheath.
Bygott, John William .....Huddersfield.
Fowler, William Henry .....Chelmsford.
Gainford, Henry .....Whitehaven.
Herington, Horace Edward ...Leighton Buzzard.
Jenkins, John Daniel.....Swansea.
Jenkins, Owen John .....Neath.
Jennings, Richard Tyldesley...Tewkesbury.
Jones, David Lloyd.....Eglwyswrw.
Lyons, Wilkie Cuthbert.....Monmouth.
Mander, Alfred .....Coventry.
Moore, John Phillips .....London.
Paddock, William George.....Cosham.
Penty, George .....Manchester.
Rice, John William .....Winchester.
Rix, Fletcher Swindells .....Ipswich.
Skipworth, Bertram George...Grantham.
Spurge, Ernest Clements .....Ipswich.
West, George William .....Stokesley.
Wybrant, Andrew .....Falsgrave.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students of the Society":—

Coulsell, Alfred George.....London.
Foster, Murray Toogood.....Collumpton.
McKay, James Alexander .....Dufftown.
Orme, Herbert Richard .....Atherstone.
Smith, Ernest Alfred Austin...Bristol.
Speedie, Robert .....Edinburgh.
Watkinson, William Harrison .Farnsworth.
Walker, Thomas .....St. Andrews.
Wheeldon, Henry Brewer .....Knighton.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

RESTORATION TO THE REGISTER.

The name of the following person who has made the required declarations and paid a fine of one guinea was restored to the Register of Chemists and Druggists:—

Theophilus Aston Wedge, 374, New Hampton Road, Wolverhampton.

ADDITION TO THE REGISTER.

The Registrar reported that—

Charles Campion Cole, New Road, Solihull, Warwickshire,

having made a declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been duly supported, his name had been placed on the Register.

REPORT OF COMMITTEES.

FINANCE.

The report of this Committee, besides the usual statement of accounts, recommended the purchase of some freehold ground rents, amounting to £68 15s. per annum, at twenty-five years' purchase, on account of the Benevolent Fund, subject to the title being satisfactory.

The PRESIDENT, in moving the adoption of the report, said there was nothing needing special remark in the early part, and it was only necessary to refer to the recommendation with regard to the purchase of some ground rents. When the Committees were recently appointed he did not think it necessary to reappoint the Freehold Investments Committee, as it was not anticipated there would be anything for it to do. Within a day or two after the last Council meeting, however, an offer was received of some ground rents on an estate adjoining others which the Council purchased some three years ago, when a stipulation was made that if others came into the market the Society should have the first offer. He brought the matter be-

fore the Library Committee, and was instructed to ask the surveyor to inspect the property, and having received a favourable report from him, it was submitted to the Finance Committee. He was very glad the opportunity had occurred, as the property was offered the Society on very advantageous terms, because since the conversion of consols ground rents had considerably risen in price.

Mr. SYMES thought this case showed the wisdom of the course which was adopted some few years ago. All these kinds of securities had very much improved during the last two or three years, so that anyone who had been at all doubtful as to the prudence of the change must see that it had proved very advantageous.

The report was adopted unanimously.

A resolution was then passed authorizing the seal of the Society to be affixed to a power of attorney for selling the stock required for the purchase of the ground rents.

The following gentlemen were also appointed the Freehold Investments Committee:—The President, Vice-President, Treasurer, and Mr. Butt.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£20 to the widow (age 30) of an associate in business and subscriber. Applicant is trying to establish a small fancy business, and has three young children dependent on her. The grant is conditional on a similar amount being raised by applicant's friends. (Wales.)

£15 to the widow (aged 35) of a registered chemist and druggist, with three young children. (London.)

£20 to the widow (age 77) of a pharmaceutical chemist member and subscriber. (Staffs.)

£10 to a registered chemist and druggist (aged 62) formerly in business, and recently discharged from a hospital as incurable. This was a case which was deferred last month. (Somerset.)

One case had been deferred for further information, and one had not been entertained.

The VICE-PRESIDENT, in moving the adoption of the report, said in his opinion and in that of the Committee he believed the cases which came before them were singularly good ones. One case had been reconsidered, and on the further information received a grant had been made. Then there were two cases of young widows—in each case with three children—who were very anxious to provide for themselves and their families. In one case there appeared to be a probability that any grant made would be supplemented by some private assistance, and the Committee had, therefore, recommended a grant of £20 on condition that a like amount was subscribed by the friends of the widow, who was desirous of starting a little fancy business. The case, *par excellence*, however, was that of the widow of a member from 1853 to 1881, and a subscriber of 10*s.* 6*d.* a year from 1867 to 1881, when he died. That impressed the Committee as being a particularly good case, just such a one as the Fund was originally founded to entertain; and although the scope of the operation of the Fund had been enlarged of late years to include outsiders, the Committee could not help feeling that it was a pleasure to look after those who in early days thought of providing for the wants of others.

The motion was then carried unanimously.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
May	Day . .	555	33	14	21
	Evening .	139	15	2	7

	Circulation of books.	Total.	Town.	Country.	Carriage paid.
May	. . . .	371	204	167	£2 6 7½

The undermentioned donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Pharmaceutical Society of Ireland, Calendar, 1888. From the SOCIETY.

Edinburgh University, Calendar, 1888. From the UNIVERSITY.

Martindale and Westcott, Extra Pharmacopœia, 4th ed., 1885. From Mr. W. MARTINDALE.

Fraser (T. R.), The Dyspnœa of Asthma and Bronchitis, 1888. From the AUTHOR.

Royal Commission for Victoria at the Colonial and Indian Exhibition, Report, 1887. From the PRESIDENT OF THE COMMISSION.

The Committee recommended the purchase of the undermentioned works:—

For the Library in London—

Churchill's Technological Handbooks, Soaps and Candles, ed. by J. Cameron, 1888.

Thomson (J. J.), Applications of Dynamics to Physics and Chemistry, 1888.

Museum.

The Curator's report had been received, and included the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
May	Morning .	518	38	4	20
	Evening .	106	14	1	3

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimen of the fruits of *Ferula fœtidissima*. From Dr. REGEL, St. Petersburg.

Specimen of False Colocynth. From Messrs. EVANS, LESCHER and WEBB.

Specimen of Barbadoes aloe leaf and flower from Montserrat. From Mr. WATT, through Messrs. Evans, Sons and Co.

Oleo-resin from the island of St. Thomé, West Africa. From Mr. H. DAVENPORT.

Specimen of the Chinese drug, *Sphæria chinensis*, and of the larva on which it grows, preserved in spirit. From Mr. J. H. WILSON, Tewkesbury.

Microscopical section of the fruit *Piper nigrum*. From Mr. J. HART, F.C.S., Manchester.

Specimen of the seed of *Brassica chinensis* and 200 specimens of North American and East Indian drugs. From the DIRECTOR, Royal Gardens, Kew.

Details of the repairs, etc., necessary to be done during the vacation had been submitted, and it was recommended that the work be done.

An engraving of the founders of the Medical Society of London in 1800 had been presented to the Society by Dr. B. W. Richardson, for which a special letter of thanks had been sent.

The Committee had considered a letter from Mr. Storey, and a memorandum from some of the students with reference to the arrangements made by the Professor of Chemistry, and had recommended that Mr. Storer be informed that with the knowledge and consent of the Council the Professor of Chemistry has lectured at Oxford during one term in each year for the past three years, and that, having fully considered the subject, the Council is perfectly satisfied with the temporary arrangement made by the President at the end of April and now concluded with reference to certain of the lectures arranged for delivery on Wednesdays.

That with regard to the application on the same

subject from some of the lecture students, the Council fails to find that there has been any just cause for complaint or dissatisfaction, and that this resolution be conveyed to the students through the Professor.

The PRESIDENT in moving the adoption of the report said there was nothing special to call attention to in the former part of it, the repairs were not very serious, referring only to cleaning and necessary repairs, the details of which he would give if desired. With reference to the communications received from Mr. Storey and the students, he thought it might be desirable to give those members of the Council who were not on the Committee some further details, and for that purpose he would move that the Council go into Committee.

This was agreed to, and the Council went into Committee for a short time.

On resuming, the report and recommendations were adopted unanimously.

THE NORTH BRITISH BRANCH.

The following report from Mr. Hill, Assistant Secretary in Edinburgh, was read:—

"Pharmaceutical Society of Great Britain,
"North British Branch,
"36, York Place, Edinburgh,
"*June* 29, 1888.

"Richard Bremridge, Esq.

"Dear Sir,—I have formally to report that at a meeting of members and associates in business residing in Scotland, held here on Wednesday, June 20, the following gentlemen were elected as members of the Executive of the North British Branch for the ensuing year:—

PETER BOA, 119, George Street, Edinburgh.
JOHN HUTCHISON FISHER, 66, High Street, Dunfermline.
DANIEL FRAZER, 127, Buchanan Street, Glasgow.
ADAM GIBSON, Thistle Street Lane, East, Edinburgh.
WILLIAM GILMOUR, 11, Elm Row, Edinburgh.
JAMES MILLER HARDIE, 68, High Street, Dundee.
WILLIAM RAMSAY KERMATH, 1, North Bell Street, St. Andrews.
ALEXANDER KINNINMONT, 69, South Portland Street, Glasgow.
SAMUEL LAWRENCE, 101, George Street, Oban.
THOMAS MABEN, 5, Oliver Place, Hawick.
GEORGE DUNCAN MACKAY, Canning Street, Edinburgh.
JAMES MACKENZIE, 45, Forrest Road, Edinburgh.
JOHN NESBIT, 162, High Street, Portobello.
JAMES PATERSON, 133, Gallowgate, Aberdeen.
JOHN BERTRAM STEPHENSON, 48, Frederick Street, Edinburgh.
DAVID STORRAR, 228, High Street, Kirkcaldy.
ALEXANDER STRACHAN, 138, Rosemount Place, Aberdeen.
JAMES WATT, sen., High Street, Haddington.

"I have also to report that the first meeting of the new Executive took place on Wednesday, June 27, when Henry Bellyse Baildon, Murrayfield, was elected Chairman, and James Watt, sen., Haddington, Vice-Chairman of the Executive.

"I am,
"Your Obedient Servant,
"J. RUTHERFORD HILL.
"*Assistant Secretary.*"

APPOINTMENT OF PROFESSORS.

Professor ATTFIELD was re-appointed Professor of Practical Chemistry for the ensuing year.

Professor GREEN was re-appointed Professor of Botany for the ensuing year.

Professor DUNSTAN was re-appointed Professor of Chemistry for the ensuing year.

Mr. E. M. HOLMES was re-appointed to conduct the demonstrations in Materia Medica for the ensuing year.

Mr. JOSEPH INCE was re-appointed to conduct the lectures and demonstrations in Pharmacy and Practical Pharmacy for the ensuing year.

The PRESIDENT said an application had been made by a student to receive the certificate of the Intermediate Education Board for Ireland in lieu of the Preliminary examination. He had consulted the College of Preceptors and Mr. Brunker, and was informed that this was an educational body of thoroughly good standing and competency, and he therefore moved that the Boards of Examiners be authorized to accept certificates granted by the Intermediate Education Board for Ireland in lieu of the Society's Preliminary examination.

The motion was carried unanimously.

REPORT OF EXAMINATIONS.

June, 1888.

ENGLAND AND WALES.

	Candidates. Examined.	Passed.	Failed.
Major (20th)	7	2	5
,, (21st)	8	4	4
	— 15	— 6	— 9
Minor (20th)	25	12	13
,, (21st)	24	12	12
,, (22nd)	24	10	14
	— 73	—34	— 39
	88	40	48

Preliminary Examination.

Fifteen certificates by approved examining bodies had been received in lieu of the Society's examination.

LOCAL SECRETARIES.

The following list, prepared by the Library, Museum, Laboratory and House Committee, was unanimously adopted as the list of Local Secretaries for the ensuing year:—

List of Local Secretaries, 1888–1889.*

Towns eligible.	Names of persons appointed.
Aberdeen	Strachan, Alexander.
Aberystwith	Wynne, Edwin Price.
Abingdon	Smith, William.
Accrington	Stanley, Thomas.
Altrincham	Clarke, James Thomas.
Andover	Bienvenu, John.
Appleby	Longrigg, John.
Arbroath	Burn, David Haitly.
Ashbourne	Osborne, James.
Ashby de la Zouch	Bullen George Wm.
Ashford	Ingall, Joseph.
Ashton-under-Lyne	Fisher, Edwin.
Aylesbury	Turner, John.
Ayr	
Banbury	Ball, George Vincent.
Banff	Alexander, William.
Bangor	Jones, Owen.
Barnsley	Badger, Alfred.
Barnstaple	Goss, Samuel.
Barrow-in-Furness	Steel, Thomas.
Basingstoke	
Bath	Merrikin, John B.
Bedford	Taylor, James B.
Belper	Calvert, James.
Berwick	Lyle, William.
Biggleswade	Evans, John.
Bilston	Gray, Charles.
Birkenhead	
Birmingham	Southall, Alfred.
Bishop Auckland	Thorburn, Hy. Wm.

* Local Secretaries are appointed in all towns in Great Britain (except London and Edinburgh) which return a Member or Members to Parliament, and in such other towns as contain not less than three Members of the Society or Associates in Business.

Towns eligible.	Names of persons appointed.
Blackburn	Garland, Alfred P.
Blackpool	Parkinson, Charles.
Bodmin	
Bolton	Mason, William B.
Boston	Haller, Frederick Wm.
Bournemouth	Duncan, Alexander.
Bradford (Yorkshire)	
Brecon	Meredith, John.
Bridgend	Jenkins, David.
Bridgnorth	Deighton, Thomas Milner.
Bridgwater	Basker, John Anthony.
Bridlington	Jackson, Henry John.
Brighton	Gwatkin, James Ross.
Bristol	Stroud, John.
Bromley	Baxter, William W.
Burnley	Cowgill, Bryan H.
Burslem	Blackshaw, Thomas.
Burton-on-Trent	Wright, George.
Bury	Bowker, Ellis.
Bury St. Edmunds	Summers, Frank.
Buxton	Wright, Robert.
Camborne	Fiddick, Thomas.
Cambridge	Deck, Arthur.
Canterbury	Bing, Edwin.
Cardiff	Munday, John.
Carlisle	Thompson, Andrew.
Carmarthen	Davies, Richard Morgan.
Carnarvon	Lloyd, William.
Chatham	Crofts, Holmes C.
Chelmsford	Baker, Garrad.
Cheltenham	Barron, William.
Chertsey	Boyce, George.
Chester	Baxter, George.
Chesterfield	Windle, John T.
Chichester	Long, William Elliott.
Chippenham	Coles, John Coles.
Chorley	Hill, William.
Christchurch	Green, John.
Cockermouth	Bowerbank, Joseph.
Colchester	Cordley, William Bains.
Coventry	Hinds, James.
Crewe	Harrop, Wm. H.
Croydon	Barritt, George.
Darlington	Robinson, James.
Dartford	Wilson, Richard E.
Deal	Green, John.
Denbigh	
Derby	Cope, John A.
Devizes	Edwards, Thos. Roberts.
Devonport	Codd, Francis.
Dewsbury	
Diss	Gostling, Thomas Preston.
Doncaster	Howorth, James.
Dorking	Clift, Joseph.
Douglas	Brearey, Arthur William.
Dover	Bottle, Alexander.
Dudley	Gare, Charles Hazard.
Dumfries	Allan, William.
Dundee	Hardie, James.
Dunfermline	Seath, Alexander.
Durham	Sarsfield, William.
Ealing	Curtis, F. G.
Eastbourne	Crook, Herbert.
East Grinstead	Tully, John.
Eccles	Howie, William Lamond.
Egremont (Cumberland)	Ireland, Edward J.
Elgin	Robertson, William.
Epping	Rowland, Thomas.
Evesham	Dingley, Richard Loxley.
Exeter	Broom, William W.
Eye	Bishop, Robert.
Falkirk	Murdoch, David.
Falmouth	Newman, Walter Francis.
Fareham	Batchelor, Charles.
Faversham	Lenfestey, William G.
Flint	Jones, Owen Williams.
Folkestone	Goodliffe, George.
Forfar	Ranken, John.
Gainsborough	Spouncer, Henry Thomas.
Gateshead	
Glasgow	Kinninmont, Alexander.
Gloucester	Foulkes, William Henry.
Grantham	Whysall, William.
Gravesend	Clarke, R. Feaver.
Greenock	McNaught, Archibald.
Grimsby, Great	Cook, Robert, Junr.
Guildford	Martin, Edward W.
Haddington	Watt, James.
Halifax	Dyer, William.
Hanley	Eardley, James F.
Harrogate	Davis, R. Hayton.
Hartlepool	Jackson, William G.
Harwich	Bevan, Charles F.
Hastings and St. Leonards	Tharle, Charles A.
Hawick	Maben, Thomas.
Helensburgh	Harvie, George.
Henley-on-Thames	Batchelor, Charles J. H.
Hereford	Williams, Walter.
Hertford	Durrant, George R.
Hexham	Gibson, John Pattison.
Heywood	Beckett, William.
Hitchin	Ransom, William.
Honiton	Dyer, Edward H.
Horncastle	Kemp, Herbert W.
Houghton-le-Spring	Rowell, R. H.
Huddersfield	King, William.
Hull	Bell, Charles Bains.
Huntingdon	Provost, John Pullen.
Huntly	Chalmers, George.
Hyde	Wild, Joseph.
Hythe	Lemmon, Robert Alce.
Inverness	Allan, Alexander.
Ipswich	Anness, Samuel Richard.
Jersey	Ereaut, John.
Keighley	Robinson, Whiteley.
Kendal	Severs, Joseph.
Kettering	Thursfield, John F.
Kidderminster	
Kilmarnock	Borland, John.
King's Lynn	Count, Sydney.
Kingston-on-Thames	Walmsley, Samuel.
Kingswinford	
Kirkcaldy	Storrar, David.
Knutsford	Silvester, Henry T.
Lancaster	Vince, James.
Launceston	White, Thomas.
Leamington	Pullin, W. H.
Leeds	Reynolds, Richard.
Leek	Johnson, William.
Leicester	Clark, Walter Beales.
Leigh (Lancs.)	Bennett, John W.
Leighton Buzzard	Readman, William.
Leith	Finlayson, Thomas.
Leominster	Sandiland, R. B.
Lewes	Saxby, Henry.
Lichfield	Perkins, John Jaquest.
Lincoln	Maltby, Joseph.
Liverpool	Symes, Charles.
Llandudno	Brookes, George.
Llanelly	Evans, Gwilym.
Loughborough	Scrase, Richard.
Louth	Hurst, John.
Lowestoft	Sale, Thomas J.
Ludlow	Woodhouse, George.
Luton	Duberley, George S.
Macclesfield	Bates, William Isaac.
Maidenhead	Walton, Ralph.
Maidstone	Stonham, W. B.
Maldon	Wallworth, David.
Malton	Buckle, James.

Towns eligible.	Names of persons appointed.
Malvern	Coldwell, David B.
Manchester, etc.	Benger, F. Baden.
Mansfield	Patterson, Douglas J.
March	Davies, Peter Hughes.
Margate	Candler, Joseph Thomas.
Market Harborough	Bragg, William B.
Melton Mowbray	Wing, Geo. N.
Merthyr Tydvil	Smyth, Walter.
Middlesborough	Buck, Thomas.
Montrose	Burrell, George.
Morpeth	Schofield, F. E.
Newark	Cherrington, Geo. W.
Newbury	
Newcastle-on-Tyne	Martin, Nicholas H.
Newcastle-under-Lyme	Poole, Weston.
Newmarket	Barrow, Frank Arthur.
Newport (Mon)	Paine, Charles.
Newport (Salop)	Barlow, John.
Newtown	Owen, Edward.
Northampton	Bingley, John.
Northwich	Humphreys, Griffith.
Norwich	Sutton, Francis.
Nottingham	Parker, William Henry.
Nuneaton	Iliffe, George.
Oldham	Hargraves, H. Lister.
Oswestry	Evans, John.
Otley	Lockwood, Thomas.
Over Darwen	Shorrock, Ralph.
Oxford	Prior, George Thomas.
Paisley	
Pembroke Dock	Laen, William.
Penrith	Redfern, Tom.
Penzance	Buckett, Alfred Henry.
Perth	Donald, David.
Peterborough	Heanley, Marshall.
Petersfield	Edgeler, William B.
Plymouth	Woods, William.
Pontefract	Bratley, William.
Pontypridd	Cule, Taliesin.
Poole	Pomeroy, Francis T.
Portsmouth, etc.	Childs, James L.
Preston	
Prestwich	Mercer, Allan.
Radcliffe	Pollitt, Joseph Moore.
Ramsey (Hunts)	Palmer, Frederick Wm.
Ramsgate	Baily, Edward.
Reading	Loam, James G.
Reigate	
Richmond (Yorks)	Thompson, John Thomas.
Ripon	Parkin, Joseph Brooks.
Rochdale	Taylor, Edward.
Rochester	Watts, George Wm.
Romford	Lasham, John William.
Ross	Matthews, Thomas.
Rotherham	Horsfield, John M.
Rothesay	Duncan, William.
Rugby	Brown, Frederic P.
Ruthin	Rouw, Theodore J.
Ryde (Isle of Wight)	Pollard, Henry Hindes.
Rye	Waters, William Allen.
St. Albans	Ekins, Arthur E.
St. Andrews	Govan, Alexander.
St. Austell	Binks, Burcham.
St. Ives (Cornwall)	Young, Tonkin.
Saffron Walden	Gilling, John.
Salisbury	Atkins, William Ralph.
Scarborough	Whitfield, John.
Seacombe	Walker, John Henry.
Sevenoaks	Pain, Edwin.
Sheffield	Ward, William.
Shields, South	Noble, John.
Shipley	Dunn, Henry.
Shrewsbury	Cross, William Gowen.
Skipton	Wilks, Robert.
Southampton	Dawson, Oliver R.
South Molton	Swingburn, Richd. Hy.
Southport	Ashton, William.
Spalding	Branston, John Williams.
Stafford	Averill, John.
Stalybridge	Simpson, Allwood.
Stamford	
Stirling	Shairp, William.
Stockport	Kay, Samuel.
Stockton-on-Tees	Brayshay, Thomas.
Stoke-on-Trent	Adams, Frank.
Stourbridge	Selleck, W. H.
Stowmarket	Gostling, George James.
Stratford-on-Avon	Hawkes, Richard.
Stroud	Coley, Samuel James.
Sudbury	Morris, Henry Ridley.
Sunderland	Harrison, John.
Swansea	Gross, Nicholas M.
Tamworth	Allkins, Thomas Boulton.
Taunton	Short, George William.
Tavistock	Gill, William.
Teignmouth	Cornelius, Joseph.
Tenby	Davies, Moses Prosser.
Tewkesbury	Wilson, John Henry.
Thirsk	
Tiverton	Havill, Paul.
Torquay	Smith, Edward.
Totnes	Morse, Charles H. S.
Truro	Percy, Thomas Bickle.
Tunbridge Wells	Howard, Richard.
Twickenham	Shelley, Henry.
Tynemouth	Stobbs, Robert.
Uttoxeter	Woodward, Henry.
Ventnor	Weston, Charles.
Wakefield	Duffin, Thomas.
Walsall	Elliott, George.
Warrington	Greenough, Hugh F.
Warwick	Pratt, Henry.
Watford	Chater, Edward Mitchell.
Wednesbury	Gittoes, Samuel James.
Wellington (Salop)	Bates, James.
Wellington (Somerset)	Windeatt, George Jas.
Wells (Somerset)	Manning, R. J.
Westbury	Paine, Charles.
West Bromwich	Roberts, George.
Weston-super-Mare	Hall, Edwin.
Weymouth	Groves, Thomas Bennett.
Whitby	Stevenson, John.
Whitehaven	Kitchin, Archibald.
Wick	Miller, Kenneth.
Widnes	
Wigan	Phillips, Jonathan.
Wimbledon	Dowdeswell, Jonathan.
Winchester	Hunt, Richard.
Windsor	Russell, Charles J. L.
Wisbech	
Wokingham	Spencer, Thomas.
Wolverhampton	Gibson, Fredk.
Woodbridge	Betts, John.
Worcester	Virgo, Charles.
Worthing	Cortis, Arthur Brownhill.
Wrexham	Edisbury, J. F.
Wycombe	Furmston, Samuel C.
Yarmouth, Great	Poll, William S.
Yeovil	Maggs, Frederick R.
York	Sowray, Joseph.

Superintendents of Written Examinations.

The President moved that Superintendents of Written Examinations for the ensuing year be appointed at the same centres as last year, and that the appointments be offered to the Local Secretaries of those centres, with the exception of London, Edinburgh and Guernsey.

Mr. Richardson asked if the Committee had not seen any necessity for altering these centres. Some

of them were exceedingly small, and he had hoped that Leicester would have been reinstated.

The PRESIDENT said it was very difficult to decide on the conflicting claims of the various towns. He believed a proposition would be brought forward before long for considerably reducing the number of Local Secretaries.

The resolution was adopted unanimously.

GENERAL PURPOSES COMMITTEE.

The report of this Committee included the usual letter from the Solicitor as to the progress of cases placed in his hands. In the case of

Horace John Neeson, 62, Wells Road, Sydenham,

a verdict for penalty and costs amounting to £21 9*s.* 7*d.* had been obtained.

A case of alleged infringement had been before the Committee, and proceedings were recommended. It was also recommended that the Registrar be instructed to remove from the Register the name of

Charles Forbes Wattie, Bellabeg, Strathdon, N.B.

The Council as usual went into Committee to consider the details of this report.

On resuming, the report and recommendations were unanimously adopted.

A resolution was accordingly passed authorizing the Registrar to remove the name of Mr. Charles Forbes Wattie from the Register.

Society of Chemical Industry.

EIGHTH ANNUAL MEETING.

The annual meeting of the Society of Chemical Industry was held on Wednesday last in the Bute Hall of Glasgow University, which had been kindly lent for the purpose by the Senate. The chair was taken at 11 a.m. by the President, Professor Dewar, M.A., F.R.S. There was a good attendance of members. The proceedings commenced by the reading of the following—

Report of the Council.

The Council is able to report a continued increase in the membership of the Society. During the year 209 new members have been elected, and 116 have been removed by death, resignation, and other causes, showing a net gain of 93. The total number of members is now 2,395.

Among those whose deaths we have to record are Mr. Chas. Moseley, of Manchester; Mr. Rupert Prentice, of Stowmarket; Mr. Andrew Bevan, of Llanelly; Mr. Jas. Taylor, of London; and Mr. Thos. Routledge, of Sunderland; all valuable members of the Society.

The papers read before the various Sections during the session, fifty-eight in number, maintain their character for general usefulness. The Council would place on record its best thanks to the authors who have communicated papers to the various Sections. Eight communications were also published in the Journal.

The contract with Messrs. Emmott and Co. having expired on December 31 last, tenders to print and publish the Society's Journal were invited, and nine firms accepted the invitation. After long and careful comparison it was resolved to accept the tender of Messrs. Eyre and Spottiswoode, and the Council so far has every reason to be satisfied with the manner in which the contract is being carried out.

Allusion was made two years ago to the generous offer of Mr. Raphael Weldon to place at the disposal of the Society the chemical portion of the library of his late father, Mr. Walter Weldon. After mature consideration it has been preferred to accept only a small portion of the volumes—those which bear closely upon the special departments with which Mr. Weldon was identified.

It is proposed to put in force Bye-law 29 on and after January 1st next, and to send the Journal to such members only as have paid their subscription. This is due to the fact that the number of members in arrear has increased during 1887.

The finances of the Society, as will be seen from the balance sheet, are in a satisfactory state, and show an ample surplus to provide for contingencies. On June 22 last the Treasurer reported that the Society had £2088 11*s.* 9*d.* invested and £1761 12*s.* 9*d.* in the bank as against £1039 10*s.* 4*d.* invested and £1500 18*s.* 9*d.* in the bank at the time of the last annual meeting. Under these circumstances it is with great pleasure that the Council has felt able to make some addition to the salaries of the Editor and General Secretary.

In conclusion, the Council would observe that, to fulfil the purposes for which the Society was founded, it is necessary to fully maintain and even increase the number of members. This can be only achieved by that hearty individual support which is derived from a personal conviction of the value of the work in which the Society is engaged.

The statement of revenue and expenditure, made up to the 23rd of March last, showed that the receipts during the previous twelve months had been £3269 17*s.* 2*d.*, of which £2758 8*s.* 6*d.* represented annual subscriptions, £49 7*s.* 2*d.* interest on invested capital, and £402 1*s.* 6*d.* was revenue on account of the Journal for sales and advertisements. The other side showed a balance of revenue over expenditure amounting to £468 18*s.* 10*d.*, the principal outgoings being on account of the printing and publishing of the Journal, amounting to £2019 6*s.* 11*d.*

At the close of the reading of the report the Secretary announced that by the election of new members that had taken place that morning, the membership of the Society had been increased to over 2400.

The report was unanimously adopted.

Scrutineers were appointed to examine the balloting paper for the election of the new Council.

Professor Dewar then proceeded to deliver his—

Presidential Address.

He said that this was the first occasion on which the Society of Chemical Industry had visited the industrial metropolis of Scotland. The objects of the Society were so well known to all the members that he need hardly say that there could be no more fitting place for the meeting of the Society than Glasgow, because within a very short radius of the city there were probably the most varied chemical manufactures that could be met with in the United Kingdom. They might not be in each individual department so great as in some other localities, but for variety, for interest, for ingenuity which had been exhibited in recent years, and in fact through a long past, no doubt Scotland deserved enormous credit. The members had come to Glasgow to be stimulated by observing other works, by being invited hospitably to see new industries, and that being the case it was necessary that they should consider not only the aims and objects of the Society, but that they should also consider what they were there for the purpose of doing. The fact that they were there met in the magnificent hall of the University was in itself a proof that the aims they had in view were reciprocated by the Principal and Senate of the University. It proved that there was no desire to dissociate theoretical science from applied science, and that they wished to encourage the objects of the Society. He thought all would agree that the Principal and Senate deserved hearty thanks for their generosity. Referring to the choice of a subject for an address, Professor Dewar said that the variety of material that was annually produced by the Society

in its papers showed that it would be quite impossible for any one person to pretend, even if he were a craftsman or manufacturer himself, to deal with the large number of subjects that were discussed in the different sections. It was sufficient for each one who had to discharge the duties of president to refer to something either strictly within his own department or knowledge, or to deal with some proved generalities. It seemed to him that on that occasion, meeting in Glasgow for the first time, that a reference to something which was connected with the broader cultivation of chemistry and with some of the transitions which had taken place in that science might not be inappropriate. The concentrated aim of the Society might be condensed and expressed by saying that it wished prominently to bring before the community the idea that industrial supremacy was not an inalienable possession which one generation could hand down to another with perfect security, but was an unstable possession which could only be maintained through the scientific intelligence of cultivated industry. He wished to call attention to the fact that Scotland had done a great deal towards establishing and stimulating a view of chemical action which is now becoming very important. It might be said that there were two principal schools of chemical science in the present day. One cultivated especially what was commonly termed organic chemistry, occupying itself with the construction and architectural building up of new compounds, which it produced to the extent of many thousands every year. The other school occupied itself more specifically with the physical relations of chemical action and the investigation of chemical constants. This latter school might be said to have originated in Scotland and to have had its foundations laid in the work of Black. It was pointed out that Black was very cautious in the avoidance of compromising terms and all hypothesis, so that in his early teaching in that university he did not describe his lectures as lectures on chemistry, but as lectures on the effect of heat and mixture as a mode by which chemical change ought to be studied. In the discussions that were current at that time as to the origin of the earth, Black's statements as to carbonate of lime being quickened under the influence of heat were quoted as being inconsistent with the existence of carbonate of lime in the crust of earth under the conditions that, according to the Vulcanist theory, were supposed to have existed during its formation. Hutton argued that the explanation was to be found in influence exerted by pressure in preventing causticization taking place. This, however, was not proved until after Hutton's death, when Hall experimentally demonstrated the effects of pressure in modifying the action of heat. Probably the explanation of the early Scotch chemists working in this particular direction was to be found in the fact that the Scotch universities were at that time saturated with the Newtonian philosophy, and Professor Dewar quoted in illustration a passage from Newton, in which he spoke of the particles of matter attracting one another with some force that becomes very intense when the particles are close together, as containing the germ of the results of subsequent investigations. After Hall's work the subject was left dormant, until in 1864 Grove's experiment, showing that platinum at a white heat dropped into water decomposed it, attracted Deville's attention, and led to the investigation that not only explained this result, but threw much light upon the phenomena of dissociation. The conclusions arrived at were practically the same as those of Hall, showing the relation between heat and temperature from another aspect. The foregoing work Professor Dewar attributed specially to the influence of the Scottish school. He then referred to some analogous researches from other sources. Dalton's prediction as to the liquefaction of gases had been verified by the work of Faraday, and the study of the gases, especially in respect to their physical properties, had been followed up by Regnault and Rankin, one of the results being the establishment of data that made it possible to calculate the heat of combustion. Reference was also made to the tables elaborated by Willard Gibbs showing the relations of dissociation to chemical change. The outcome was that the phenomena of chemical change could be made the subjects of calculation with as great precision as physical phenomena. In closing this section of his discourse the speaker alluded to Van t'Hoff's investigations into the velocity of chemical action, especially in respect to the correlation of chemical action with mass. Professor Dewar then referred more briefly to the work done in organic chemistry; and claimed that the investigation of the coal tar bases had been initiated by Thomas Anderson, whilst other Scotch chemists had contributed largely to the stock of knowledge in that direction. No problem was likely to affect this country more than that relating to the supply of caloric; and those who had visited the petroleum fields and witnessed the apparently unlimited supplies of gas fuel would have realized how necessary it would become for small countries to economize. The application and the utilization of waste products in recent years had struck everyone, and as being very closely connected with Glasgow he mentioned the vast utilization of salts of ammonia. He stated that in one large works where something like one million cubic feet of gas was dealt with per diem, an absorption of ammonia was effected amounting to about seven tons per day, and where an amount of gas weighing something like three thousand tons was dealt with. They would thus have an idea of the waste that had been going on previously without anyone thinking of utilizing it. The object of the Society, he went on to say, was to bring together abstract science and applied science for mutual benefit. Not only had the Society established subdivision of labour throughout the country as regarded its organization, but the entire body got the benefit of the particular knowledge of individual centres. Of course, certain branches of industrial chemistry must be cultivated more in one particular locality than in another, but the Society got the newest and the best material wherever it was to be found. The fact that the Society had upwards of two thousand members, showed that the work it was doing was very much wanted. It was hoped that the progress they had made in the past would continue, as the object of the Society was to diffuse a knowledge of facts, without troubling itself too much about personal interests, which could never succeed in hiding truth. In regard to the papers that had been read before the branches of the Society during the past year, he selected for special mention that of Mr. Chance on the recovery of sulphur from sulphur waste, and one that had been communicated through himself, giving an account of the chlorine process elaborated by Messrs. Péchiney. After speaking of the elaborate operation involved in the latter process, which had raised doubts as to whether it would be practicable, he stated that it was now being carried on quite successfully. But whether successful financially at the time or not, all such work was a gain, and Balard's work on the removal of salt from sea water was quoted as a case where circumstances had been adverse to the practical application of the investigation, but nevertheless it constituted a distinct and valuable contribution to chemical science. In conclusion, Professor Dewar referred to the probable election of Mr. Ludwig Mond to the presidency, and said that he was sure he would discharge his duties according to the best interests of the Society, and that it would flourish under his hands.

On the motion of Professor Dittmar, seconded by

Sir John Neilson Cuthbertson, a vote of thanks was awarded to Professor Dewar for his address.

Professor Dewar briefly replied, and while concurring in some remarks made by Professor Dittmar in reference to the baleful influence of the prevalent system of examination, said that it was equally difficult to find a perfect teacher and an examiner with common sense.

Election of President and Vice-Presidents.

The Secretary then intimated that all the gentlemen nominated for the Council had, on a ballot, been elected, the President being Mr. Ludwig Mond; and the Vice-Presidents, Sir I. Lothian Bell, F.R.S.; Mr. R. Forbes Carpenter; Professor F. Clowes, D.Sc.; Sir John Neilson Cuthbertson; Professor James Dewar, F.R.S.; Dr. John Evans, F.R.S.; David Howard, Ivan Levingstein, E. K. Muspratt, Sir H. E. Roscoe, M.P., F.R.S.; Prof. W. A. Tilden, F.R.S.; and Mr. John Williams.

Mr. Mond accordingly took the chair, and expressed thanks for the honour they had done him.

Concluding Business.

Mr. Thomas Tyrer having, on behalf of the London section of the Society, invited the members to hold their next annual meeting there, the invitation was unanimously accepted.

This concluded the business of the meeting, and many of the members adjourned to the exhibition.

In the evening the members dined together at the Grand Hotel. On Thursday, in accordance with arrangements, visits were made to various works, and for Friday an excursion on the Firth of Clyde was organized.

Provincial Transactions.

NORTH OF ENGLAND PHARMACEUTICAL ASSOCIATION.

A special general meeting of the members of the above Association was held in their rooms, St. Nicholas Chambers, Newcastle-on-Tyne, on Thursday, June 28, at 8 p.m. The President, Mr. N. H. Martin, F.L.S., was in the chair.

There were present the Secretary, Treasurer, Messrs. Proctor, Clague, Weddell, Wright, Adams, Newcastle; Mr. Sarsfield, Durham; Mr. Foggan, Bedlington, and others. Several members sent letters of apology for non-attendance.

The minutes of the last general meeting were read and confirmed.

The President brought up the report of the Council as to the negotiations which had been carried on between the Council of the Association and the authorities of the Durham College of Science as to the removal of the Library and Museum of the Association to the new College buildings in Lax's Gardens, and after full discussion it was moved by Mr. Sarsfield, Durham, seconded by Mr. J. B. Payne, Newcastle, and carried unanimously:—"That a Committee, composed of Mr. Martin, President, Messrs. John Harrison, Sunderland, and Alderman Owen, Vice-Presidents, Mr. C. B. Ford, Secretary, and Mr. T. Rheeder, Treasurer, be appointed to carry out the arrangement with the Durham College of Science, and to sign the agreement with the College on behalf of the Association."

The President then gave a sketch of a proposed scheme of day and evening lectures and laboratory work in theoretical and practical chemistry, materia medica, botany and pharmacy, to be given in the Durham College of Science, commencing in October next.

Mr. Martin explained that in consequence of other engagements it would be impossible for him to deliver the course of lectures on materia medica, but he was glad to be able to announce that Mr. Alfred Wright, A.K.C., had kindly undertaken to do so.

Mr. B. S. Proctor hoped if a sufficient interest were shown in the pharmacy lectures it would be found possible to arrange for a course of demonstrations in practical dispensing and reading prescriptions.

This suggestion was much approved by the meeting.

After further discussion it was proposed by Mr. T. B. Clague, seconded by Mr. Sarsfield, and carried unanimously:—"That a Committee composed of Mr. Martin, President, Professor Bedson, D. Sc., Durham College of Science, and Messrs. B. S. Proctor, Stuart and Wright, lecturers, be appointed to arrange for the delivery of the lectures on the lines suggested by the proposed scheme."

It was proposed by Mr. Foggan, seconded by Mr. B. S. Proctor, and carried:—"That Messrs. Brayshay, Stockton, John Harrison, Sunderland, and T. B. Clague and N. H. Martin, Newcastle, be appointed delegates from the North of England Pharmaceutical Association to the British Pharmaceutical Conference at its approaching meeting at Bath."

Parliamentary and Law Proceedings.

Action for Damages.

On Tuesday last, Lord Lee and a jury, in the Court of Session, Edinburgh, tried an action at the instance of William Mathieson, Convalescent House, Edinburgh, against Duncan Napier and Son, herbalists, 17, Bristo Place, Edinburgh. Pursuer sued for £500 for injury alleged to have been sustained by him in consequence of the treatment which defenders prescribed for his eye. Defenders said they never heard of the pursuer or of his injuries, and they declined to recognize his claim; but, in order to avoid litigation, and continuing explicitly to repudiate the claim of pursuer, they made him an offer of ten guineas in full of all demands. They had, they said, made inquiry, but had been unable to ascertain that they ever sold any herb to the pursuer, and they did not admit that they ever did so. They believed that the injury to pursuer's eye was sustained while he was under the influence of drink in a street brawl.

Pursuer said that in September, 1887, he was lodging at No. 2, St. Mary Street. On Saturday, 24th of that month, he spent the evening calling upon friends with a companion. They had several refreshments in public-houses, but were none the worse of it. On the way home two men appeared to be quarrelling in a larking way, and one of them suddenly raised his arm to strike the other. He was immediately behind the man, and received a blow below the right eye with the man's elbow. He did not think at the time it was much hurt, but it afterwards became sore. On the Sunday afternoon a friend advised him to go to Napier's to get something to remove the discoloration below his eye. He and two companions went to Napier's shop on the Monday at the dinner hour. An oldish man looked at his eye and gave him three pieces of a root, and told him to grate it down, and to make six poultices with it and to apply them below his eye in succession, each for half an hour. When he put on the first poultice he lay down, but in ten minutes the pain was so great that he had to get up. It first began to nip his eye. He could bear it no longer than twenty minutes. The pain was unbearable; he had to take the poultice off. It felt as if it were pulling his eye down. He suffered great pain all night, and slept none. In the morning his eye was inflamed and swollen. He was unable to go to work. Dr. Gunn was sent for, and he gave him two lotions to use. On Thursday Dr. Gunn ordered him to be taken to the Royal Infirmary. He required assistance to and from the cab. He was in the infirmary till October 26. He

was so ill that he did not remember the first two or three days. Four operations were performed on his eye, one with, and three without, chloroform. When he left the infirmary the sight of his right eye had quite gone.

Dr. Gunn said that when he was called in he found that pursuer's eye-lids were inflamed. The eye proper was suffering from opacity. The root, he believed, was one of three—horse radish, Solomon's seal, or bryony. He tasted both the poultice, which had been used, and also part of the root which had not been grated down. They both had a bitter, acid taste, as if they had been steeped in an acid.

Cross-examined: It was possible to have cellular inflammation as the result of an accident. He had no doubt that the inflammation might have been, or could have been, set up by a blow, but he had never seen a case of that kind. In this case instead of cellular inflammation they had perfect destruction. When he first saw the eye he did not think that a blow would have made it in the condition in which it was. There was nothing inconsistent, from what he saw, with the inflammation in the eye being set up by accident. He could not suggest an ointment which, if applied to the skin of the cheek and not to the eye itself, would produce the irritation there was in this eye. When he saw the eye he did not form the opinion that the poultice had been applied to the eye; he thought it had been applied a little below the eye. It was possible to find a root which, combined with an acid, would, if applied to the cheek, set up inflammation, because the vapour or steam from it might enter the eye. He could not mention any root.

By his lordship: The pain commencing within five minutes of the application of the poultice would make him connect the two. He would say that the absence of pain for two days was inconsistent with the view that the tissue of the eye was injured.

Dr. Berry, ophthalmic surgeon at the Royal Infirmary, said that Mathieson's eye became part of an abcess. He could not say that Mathieson was in danger of losing his life, but it was a serious case. The man was suffering from inflammation of all the tissues of the eye. The root which had been applied was brought to the Infirmary. It had a very pungent smell, which permeated the room. He thought it must have been dipped in an acid, but he had no special knowledge which would lead him to determine what it was. The symptoms in this case were not such as were exhibited in cases of inflammation arising from a blow.

In opening the defence, Mr. Daniell said that his clients were the only firm in the city which supplied roots fresh. All other chemists supplied them in other forms, and therefore, if the root in this case had been steeped in an acid, it could not have been got there.

Mr. Duncan Napier said he began business in 1860, but he had studied the properties of herbs since he was a lad of 14. There were many herbs not mentioned in the British Pharmacopœia which possessed curative properties, and these were, owing to their cheapness, largely used by the poorer classes. They supplied, he thought, the whole of the large druggists of Edinburgh with herbs. It was a very common thing for people to come and ask something for black eyes. They formerly used to give Solomon's seal, and they sometimes gave it still, but they now also gave black bryony. His father's occupation was a publican, Solomon's seal grew in the back garden, and it was used for black eyes. There was often fighting in the public-house. He grew Solomon's seal in the garden, and took it up as required for the shop. He always used it fresh. Nearly every other chemist kept it in acid to preserve it. Bryony he got from London. They had somewhere over 3000 black eyes to deal with every year. He had used these two herbs for black eyes, and never, since he was 14 till now, did he ever hear that anybody had been injured by them. To the best of his knowledge he never saw the pursuer until to-day. He never treated a herb with an acid.

Cross-examined: His view was that the herb was not got in his shop. He never heard of a case of a boy whose eye was destroyed by his treatment; he never paid £9 for such a claim. Instances of complaint with reference to their treatment were very rare. On the other side, he could produce many testimonies.

By his Lordship: When roots were steeped in acid he believed it was usually dilute acetic acid. He could not hold it true that he ever gave the pursuer any root.

Mr. Andrew Napier, a son of the former witness, said he never heard of any injury to eyes from the use of either Solomon's seal or black bryony. He kept a note last week, and they treated over forty black eyes.

Mr. Henry Potter, herbalist, London, said that black bryony was largely used in London. Solomon's seal was not so well known there. They kept neither of them in acid.

An Edinburgh chemist said he kept Solomon's seal in dilute acid.

Dr. A. E. Jones said he had been surgeon to the Royal Eye Hospital, Manchester, for thirteen years, and held an appointment in Bolton. The Manchester Hospital was the largest eye hospital in the world except one, that at Moorfields. They had over 18,000 cases in the year. If an eye were affected with cellular inflammation, the whole eye might become an abcess. It was not impossible that cellular inflammation might be set up by a blow, and not a very strong blow.

Cross-examined: He had never known a case in which cellular inflammation had been set up by the application of a corrosive in the neighbourhood of the eye. He could account for an acid getting into the eye setting up cellular inflammation, but there must have been antecedent inflammation.

By his lordship: In a case such as this he would not connect the putting on of the poultice with the commencement of the pain; he knew of no poultice which would do it. This was all the evidence.

The jury, after an absence of about half an hour, returned a unanimous verdict for the pursuer, and awarded him £200.—*Edinburgh Evening News.*

REGISTRATION OF TRADE MARKS.

The following are the clauses relating to the Registration of Trade Marks that appear in a Bill to Amend and Consolidate the Law relating to Patents for Inventions, Registrations of Designs and of Trade Marks, which has been read a first time in the House of Lords:—

Registration of Trade Marks.

62. (1)—*Application for Registration.*—The comptroller may, on application by or on behalf of any person claiming to be the proprietor of a trade mark, register the trade mark.

(2) The application must be made in the form set forth in the first schedule of this Act, or in such other form as may be from time to time prescribed, and must be left at, or sent by post to, *such place and in such manner as may be prescribed.*

(3) The application must be accompanied by the prescribed number of representations of the trade mark, and must state the particular goods or classes of goods in connection with which the applicant desires the trade mark to be registered.

(4) The comptroller may, if he thinks fit, refuse to register a trade mark, but any such refusal shall be subject to appeal to the Board of Trade, who shall, if

required, hear the applicant and the comptroller, and may make an order determining whether, and subject to what conditions, if any, registration is to be permitted.

(5) The Board of Trade may, however, if it appears expedient, refer the appeal to the Court; and in that event the Court shall have jurisdiction to hear and determine the appeal and may make such order as aforesaid.

(6) *Where an applicant for the registration of a trade mark otherwise than under an international convention is out of the United Kingdom at the time of making the application he shall give the comptroller an address for service in the United Kingdom, and if he fails to do so the application shall not be proceeded with until the address has been given.*

63. *Limit of Time for Proceeding with Application.*—Where registration of a trade mark has not been or shall not be completed within twelve months from the date of the application, by reason of default on the part of the applicant, *the comptroller shall give notice of the non-completion to the agent employed on behalf of the applicant, and if at the expiration of fourteen days from that notice the registration is not completed, shall give the like notice to the applicant, and if at the expiration of the fourteen days, or such further time as the comptroller may in special cases permit, the registration is not completed*, the application shall be deemed to be abandoned.

64. (1) *Conditions of Registration of Trade Mark.*—For the purposes of this Act, a trade mark must consist of or contain at least one of the following essential particulars:—

(*a*) A name of an individual or firm printed, impressed, or woven in some particular and distinctive manner; or

(*b*) A written signature or copy of a written signature of the individual or firm applying for registration thereof as a trade mark; or

(*c*) A distinctive device, mark, brand, heading, label *or* ticket; *or*

(*d*) *An invented word or invented words*; *or*

(*e*) *A word or words arbitrarily selected and having no reference to the character or quality of the goods, and not being the name of any place.*

(2) There may be added to any one or more of *the essential particulars mentioned in this section* any letters, words or figures, or combination of letters, words or figures, or of any of them, *but the applicant for registration of any such additional matter must state in his application the essential particulars of the trade mark, and must disclaim in his application any right to the exclusive use of the added matter, and a copy of the statement and disclaimer shall be entered on the Register.*

(3) Provided *as follows*:—

(i) *A person need not under this section disclaim his own name or the foreign equivalent thereof, or his place of business, but no entry of any such name shall affect the right of any owner of the same name to use that name or the foreign equivalent thereof;*

(ii) Any special and distinctive word or words, letter, figure, or combination of letters or figures or of letters and figures used as a trade mark before the thirteenth day of August one thousand eight hundred and seventy-five may be registered as a trade mark under this part of this Act.

65. A trade mark must be registered for particular goods or classes of goods.

66. *Connection of Trade Mark with Goods. Registration of a Series of Marks.*—When a person claiming to be the proprietor of several trade marks which, while resembling each other in the material particulars thereof, yet differ in respect of (*a*) the statement of the goods for which they are respectively used or proposed to be used, or (*b*) statements of numbers, or (*c*) statements of price, or (*d*) statements of quality, or (*e*) statements of names of places, seeks to register such trade marks, they may be registered as a series in one registration. A series of trade marks shall be assignable and transmissible only as a whole, but for all other purposes each of the trade marks composing a series shall be deemed and treated as registered separately.

67. *Trade Marks may be Registered in any Colour.*—A trade mark may be registered in any colour *or colours*, and such registration shall (subject to the provisions of this Act) confer on the registered owner the exclusive right to use the same in that or any other colour *or colours*.

68. *Advertisement of Application.*—Every application for registration of a trade mark under this part of this Act shall as soon as may be after its receipt be advertised by the Comptroller.

69. (1) *Opposition to Registration.*—Any person may within *one month or such further time, not exceeding three months, as the Comptroller may allow*, of the advertisement of the application, give notice in duplicate at the patent office of opposition to registration of the trade mark, and the Comptroller shall send one copy of such notice to the applicant.

(2) Within *one month* after receipt of such notice or such further time as the Comptroller may allow, the applicant may send to the Comptroller a counter statement in duplicate of the grounds on which he relies for his application, and if he does not do so, shall be deemed to have abandoned his application.

(3) If the applicant sends such counter statement, the Comptroller shall furnish a copy thereof to the person who gave notice of opposition, and shall, *after hearing the applicant and the opponent, if so required, decide whether the trade mark is to be registered, but his decision shall be subject to appeal to the Board of Trade, who shall, if required, hear the applicant and the opponent and the Comptroller, and may make an order determining whether, and subject to what conditions (if any), registration is to be permitted.*

(4) *The Board of Trade may, however, if it appears expedient, refer the appeal to the Court, and in that event the Court shall have jurisdiction to hear and determine the appeal, and may make such order as aforesaid.*

(5) *If the applicant abandons his application after notice of opposition in pursuance of this section he shall be liable to pay to the opponent such costs in respect of the opposition as the Comptroller may determine to be reasonable.*

(6) *Where the opponent is out of the United Kingdom he shall give the Comptroller an address for service in the United Kingdom.*

70. *Assignment and Transmission of Trade Mark.*—A trade mark, when registered, shall be assigned and transmitted only in connection with the goodwill of the business concerned in the particular goods or classes of goods for which it has been registered, and shall be determinable with that goodwill.

71. *Conflicting Claims to Registration.*—Where each of several persons claims to be registered as proprietor of the same trade mark, the Comptroller may refuse to register any of them until their rights have been determined according to law, and the Comptroller may himself submit or require the claimants to submit their rights to the Court.

72. (1) *Restrictions on Registration.*—Except where the Court has decided that two or more persons are entitled to be registered as proprietors of the same trade mark, the Comptroller shall not register in respect of the same goods or description of goods a trade mark identical with one already on the register with respect to such goods or description of goods.

(2) *Except as aforesaid*, the Comptroller shall not register with respect to the same goods or description of goods a trade mark *having such resemblance to* a trade mark already on the register with respect to

such goods or description of goods as to be calculated to deceive.

73. *Further restriction on registration.*—It shall not be lawful to register as part of or in combination with a trade mark any words the use of which would, by reason of their being calculated to deceive or otherwise, be deemed disentitled to protection in a court of justice, or any scandalous design.

74. (1) *Saving for power to provide for entry on register of common marks as additions to trade marks.*—Nothing in this Act shall be construed to prevent the comptroller entering on the register, in the prescribed manner, and subject to the prescribed conditions, as an addition to any trade mark—

(*a*) In the case of an application for registration of a trade mark used before the thirteenth day of August one thousand eight hundred and seventy-five—

Any distinctive device, mark, brand, heading, label, ticket, letter, word, or figure, or combination of letters, words, or figures, though the same is common to the trade in the goods with respect to which the application is made;

(*b*) In the case of an application for registration of a trade mark not used before the thirteenth day of August one thousand eight hundred and seventy-five—

Any distinctive word or combination of words, though the same is common to the trade in the goods with respect to which the application is made;

(2) *The applicant for registration of any such addition must, however, state in his application the essential particulars of the trade mark, and must disclaim in his application any right to the exclusive use of the added matter, and a copy of the statement and disclaimer shall be entered on the register.*

Provided that a person need not under this section disclaim his own name or the foreign equivalent thereof, or his place of business, but no entry of any such name shall affect the right of any owner of the same name to use that name or the foreign equivalent thereof.

(3) Any device, mark, brand, heading, label, ticket, letter, word, figure, or combination of letters, words, or figures, which was or were, before the thirteenth day of August one thousand eight hundred and seventy-five, publicly used by more than three persons on the same or a similar description of goods shall, for the purposes of this section, be deemed common to the trade in such goods.

Effect of Registration.

75. *Registration equivalent to public use.—Application for* registration of a trade mark shall be deemed to be equivalent to public use of the trade mark, *and the date of the application shall for the purposes of this Act be deemed to be and as from the first day of January one thousand eight hundred and seventy-six to have been the date of the registration.*

76. *Right of first proprietor to exclusive use of trade mark.*—The registration of a person as proprietor of a trade mark shall be *primâ facie* evidence of his right to the exclusive use of the trade mark, and shall, after the expiration of five years from the date of the registration, be conclusive evidence of his right to the exclusive use of the trade mark, subject to the provisions of this Act.

77. *Restrictions on actions for infringement, and on defence to action in certain cases.*—A person shall not be entitled to institute any proceeding to prevent or to recover damages for the infringement of a trade mark unless, in the case of a trade mark capable of being registered under this Act, it has been registered in pursuance of this Act, or of an enactment repealed by this Act, or in the case of any other trade mark in use before the thirteenth of August one thousand eight hundred and seventy-five, registration thereof under this part of this Act, or of an enactment repealed by this Act, has been refused. The comptroller may, on request, and on payment of the prescribed fee, grant a certificate that such registration has been refused.

77*a*. *Certificate as to exclusive use and costs thereon.—In an action for infringement of a registered trade mark the court or a judge may certify that the right to the exclusive use of the trade mark came in question, and if the court or a judge so certifies, then in any subsequent action for infringement the plaintiff in that action, on obtaining a final order or judgment in his favour, shall have his full costs, charges, and expenses as between solicitor and client, unless the court or judge trying the subsequent action certifies that he ought not to have the same.*

Register of Trade Marks.

78. *Register of trade marks.*—There shall be kept at the patent office a book called the Register of Trade Marks, wherein shall be entered the names and addresses of proprietors of registered trade marks, notifications of assignments and of transmissions of trade marks, and such other matters as may be from time to time prescribed.

79. (1) *Removal of trade mark after fourteen years unless fee paid.*—At a time not being less than two months nor more than three months before the expiration of fourteen years from the date of the registration of a trade mark, the comptroller shall send notice to the registered proprietor that the trade mark will be removed from the register unless the proprietor pays to the comptroller before the expiration of such fourteen years (naming the date at which the same will expire) the prescribed fee; and if such fee be not previously paid, he shall at the expiration of one month from the date of the giving of the first notice send a second notice to the same effect.

(2) If such fee be not paid before the expiration of such fourteen years the comptroller may after the end of three months from the expiration of such fourteen years remove the mark from the register, and so from time to time at the expiration of every period of fourteen years.

(3) If before the expiration of the said three months the registered proprietor pays the said fee together with the additional prescribed fee, the comptroller may without removing such trade mark from the register accept the said fee as if it had been paid before the expiration of the said fourteen years.

(4) Where after the said three months a trade mark has been removed from the register for nonpayment of the prescribed fee, the comptroller may, if satisfied that it is just so to do, restore such trade mark to the register on payment of the prescribed additional fee.

(5) Where a trade mark has been removed from the register for nonpayment of the fee or otherwise, such trade mark shall nevertheless for the purpose of any application for registration during *one year* next after the date of such removal, be deemed to be a trade mark which is already registered *unless it is shown to the satisfaction of the comptroller that the nonpayment of the fee arises from the death or bankruptcy of the registered proprietor, or from his having ceased to carry on business, and that no person claiming under that proprietor or under his bankruptcy is using the trade mark.*

80. *Fees for registration, &c.*—There shall be paid in respect of applications and registration and other matters under this part of this Act, such fees as may be from time to time, with the sanction of the Treasury, prescribed by the Board of Trade; and such fees shall be levied and paid to the account of Her Majesty's Exchequer in such manner as the Treasury may from time to time direct.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Wright, Davies, Pilkington, Backhouse, Dott, Mumford, Tamar Ostium, Pharmacist, Mic Mac.

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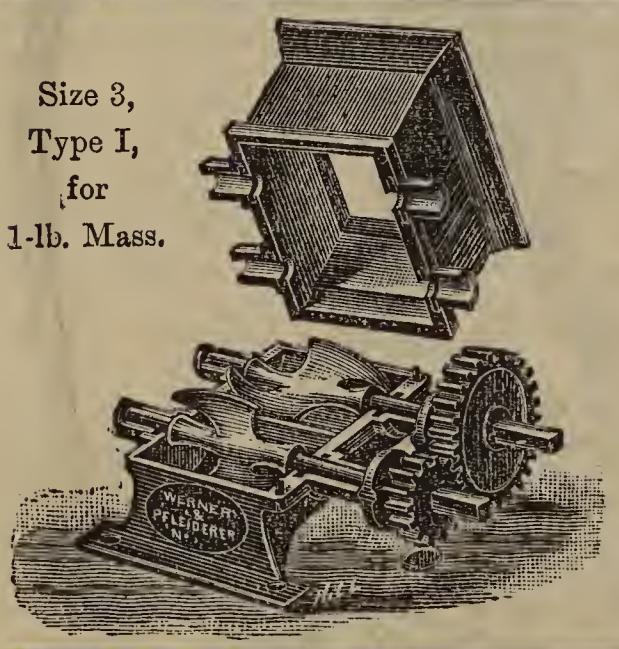

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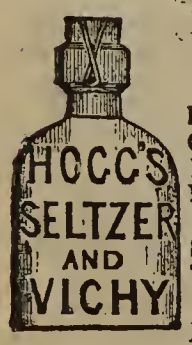

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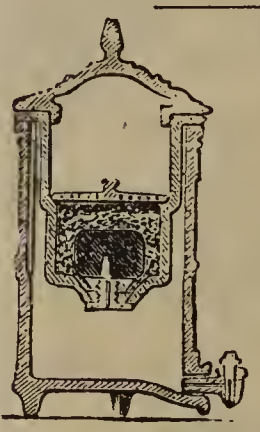

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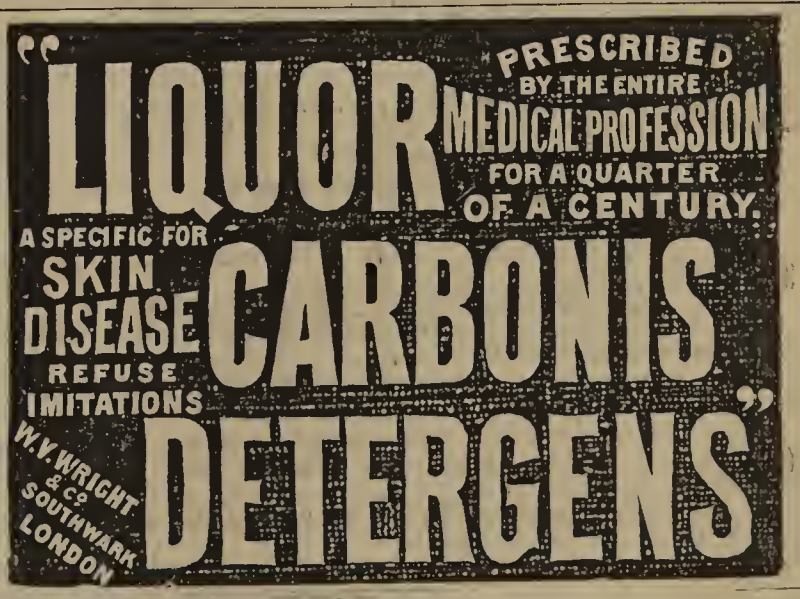

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DENTAL PUPIL. A qualified Dental Surgeon has a vacancy for a pupil, resident or non-resident. One who has passed his Preliminary examination preferred. Premium required. Address, DENTAL LICENCIATE, 9, Head St., Colchester.

A JUNIOR CLERK, with some knowledge of the Drug business. Must be a good writer and quick at figures. Apply by letter only to B. C., 300, High Holborn, London, W.C.

JUNIOR ASSISTANT for two or three months. Must be thoroughly trustworthy and capable. An Abstainer and member of a Christian church preferred. Apply, with full particulars and enclosing photo to W. S. BAKER, Clacton-on-Sea.

FOR a light business in country town. A JUNIOR just out of his time. Dissenter and abstainer preferred. Apply, with full particulars and carte (if convenient), to D. S. S., care of Hodgkinsons, Treacher & Clarke, 198, Upper Whitecross Street, London, E.C.

AT once.—A Senior ASSISTANT. Must be obliging in manner, and well up in his business. One able to Extract Teeth preferred. Out-doors. Mr. ANNETT, 18, Norton Folgate, E.C.

REQUIRED the beginning of August for the season. A Junior ASSISTANT, out-door, of good address and appearance, for branch Pharmacy, under manager. Must be an accurate and neat Dispenser. Apply, giving references, stating weekly salary required, and enclosing carte (to be returned), to R. HAYTON-DAVIS, Pharmacist, High Harrogate.

MANAGER required who can invest £200 or more in a profitable established Pharmacy, and receive a share of the profits. An income of £200 a year will be guaranteed to a suitable gentleman, who need not be qualified. Address, letter only, Mr. HENRY, 158, Lavender Hill, S.W.

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AN Assistant as Junior, for a good middle class country business. Age about 24. Minor qualification. Hours from 8 to 8, and 10 on Saturday. Salary indoors £40 per year. Apply with full particulars, and enclose carte, to Rogers, Chemist, Newmarket.

IMMEDIATELY.—An Assistant, accustomed to a first-class Dispensing business. Minor qualification. Apply to John Allden, 156, Cromwell Rd., South Kensington, S.W.

LOCUM Tenens. For a retail country business for a few weeks. Must have been accustomed to an agricultural trade. Grimble & Kent, Chemists, Boston, Lincs.

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MANAGER for middle class suburban business. Energetic and experienced. Age 26 to 30. Light Retail, Dispensing, Prescribing, &c. Good references indispensable, with carte. Address, Chemicus, 5 Wykeham St., Liverpool.

TO Students.—Wanted immediately, part-time Assistant. In-doors. One that could give full time for a month during the holidays preferred. Another kept. Must be a reliable Dispenser, with good references. An interview preferred, or full particulars and photo to Evan Hughes, 9, Goldhawk Rd., W.

JUNIOR Dispenser, with good experience and Minor qualification. Letter only, stating age and salary required. Out-door. J. S., 135, Queen's Rd., Brighton.

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TO Students and others.—An Assistant for a few weeks from 1st August. Pharmacist, 103, High Holborn, W.C.

MANAGING Assistant, age about 30, active and pushing, to work up a Branch business. Medium class trade. In-door. Unmarried. Permanency for a suitable man. Apply personally, 37, Berners St., Oxford St., London, W., if possible between 10 and 11.

BUSINESSES FOR DISPOSAL.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

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LIVERPOOL.—Leading thoroughfare. Light Retail and Dispensing. Old established. Well stocked. Handsome corner shop with commodious house attached, on lease. In hands of present proprietor over 15 years. Capital opening for pushing man. Address, X. Y. Z., care of Messrs. Evans, Sons & Co., Liverpool.

A RETAIL and Prescribing Business. Established 14 years by the vendor. Comfortable house and garden. Rent £42. Private entrance. In-coming £400. Apply by letter, or personally, from 2 to 4, or 6 to 8, to Mr. Gill, 56, Grayshott Rd., Lavender Hill, S.W.

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A LIGHT Retail and Dispensing Business, making a net profit of £350 to £500 a year. Part Mixed trade not objected to. Cash ready. Address, Iodine, care of Messrs. Maw, Son & Thompson, Aldersgate St., London, E.C.

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A GENUINE good class Dispensing and Family Business, in or near London. Must return not less than £600, and be capable of improvement. House must be either a corner one, or have private entrance, and, at least, a small garden attached. Address, with full particulars and lowest price, to Tenax, care of Messrs. Baldock & Co., South Norwood, London, S.E.

MR. G. B. CROCKER,

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9.	CHESHIRE ...	„	1300.	„	55.	„	700.
10.	LEYTONSTONE	„	240.	„	40.	„	225.
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Yours faithfully, VICTORINA.

"Much pleased with Show Card."

JOSEPH BEACH,

Monument Road, BIRMINGHAM.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 942.] SATURDAY, JULY 14, 1888. [PRICE FOURPENCE

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

NOTICES.

COUNCIL EXAMINATION PRIZES.

First Prize.—Pereira Medal in silver, and a present of books value £5, or thereabouts, given by Mr. T. H. Hills.

Second Prize.—The Pharmaceutical Society's Medal in silver, and a present of books value £3, or thereabouts, given by Mr. T. H. Hills.

Third Prize.—The Pharmaceutical Society's Medal in bronze, and a present of books value £2, or thereabouts, given by Mr. T. H. Hills.

The Examination for these prizes will be held in London and Edinburgh on Monday, the 23rd instant, at 10 a.m.

Pharmaceutical Chemists who have passed the Major Examination during the present Session, and who were Associates of the Society at the time of passing the Examination, are entitled to compete for the Prizes.

Persons intending to compete must give notice of their intention to the Registrar, on or before Wednesday next, the 18th instant, after which no further entries will be received.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held.

LIBRARY AND MUSEUM.

The Library is open daily from 9 a.m. until 10 p.m. (Saturdays, 9 a.m. to 2 p.m. only.) The Museum is open daily from 9 a.m. until 5 p.m., and from 7 p.m. until 10 p.m. (Saturdays, 9 a.m. to 2 p.m. only.)

RESEARCH LABORATORY.

The Research Committee gives notice that there will be vacancies for six workers in the Laboratory next October. Applications should include a full account of the applicant's qualifications, and should be addressed to the Director of the Research Laboratory, 17, Bloomsbury Square, London, W.C.

The following are the

Regulations for the Laboratory.

Any person who desires to assist in the researches undertaken by the Director or who wishes to pursue an investigation on his own account may be admitted into the Laboratory as a worker by the Committee on the nomination of the Director, to whom written application is to be made for the purpose. A worker who desires to remain engaged in investigation for more than one year shall renew his application for admission each year.

Each worker will be expected before his admission to satisfy the Director of his competency, and if he wishes to undertake any particular investigation he must also furnish a statement in writing of its nature and extent.

Every worker will be furnished with gas and water, and, at the discretion of the Director, with such materials and apparatus as the worker may require. He will be expected, on being called upon by the Director, to reinstate such apparatus as he may damage.

No inquiry having a direct commercial object shall be conducted in the Laboratory.

The selection of subjects for investigation shall be left to the discretion of the Committee, assisted by the Director. The Director shall allow the utmost freedom to each investigator in the methods of research, so far as they are consistent with the orderly government of the laboratory. No publication of any research shall take place without the sanction of the Committee or Director, and in all cases the words "Communication from the Research Laboratory of the Pharmaceutical Society of Great Britain," or their equivalent, shall be appended to the title of each paper.

The Director shall have power (for any sufficient cause) to order a worker to cease to use the laboratory at any time or immediately, but the worker shall have a right of appeal to the Committee, whose decision shall be final.

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"The appearance of the fourteenth edition of this excellent and useful work will he hailed with satisfaction by most men engaged in practice to whom the qualities of the work have long been familiar. . . . We can cordially recommend the present volume as fully equal to its predecessors, which is in itself a sufficient guarantee of its comprehensiveness and accuracy."—BRITISH MEDICAL JOURNAL, July 3rd, 1886, p. 23.

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THE EXTRA PHARMACOPŒIA,

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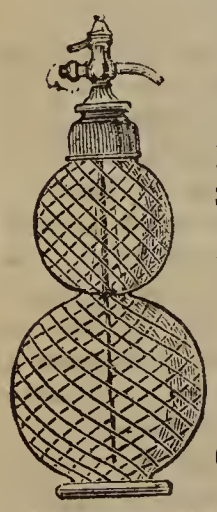

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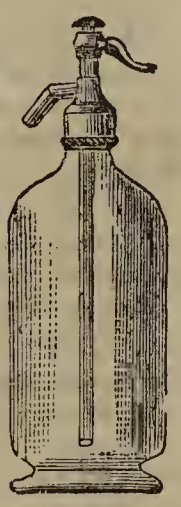

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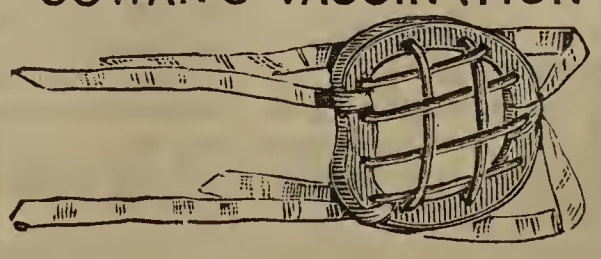

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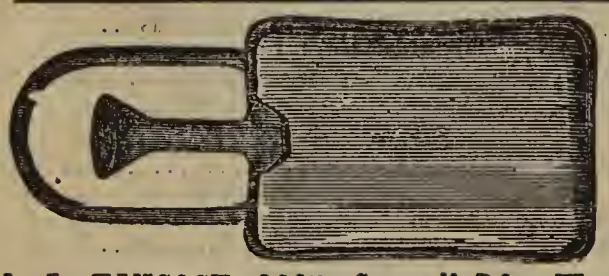

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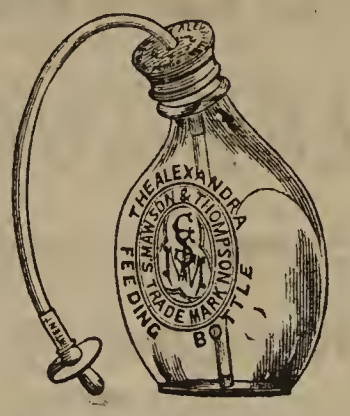

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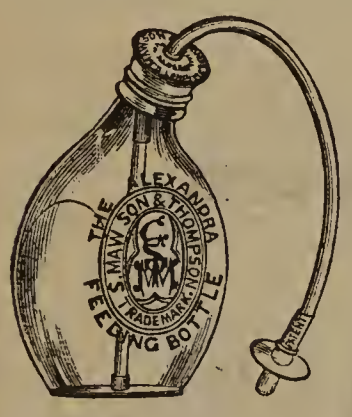

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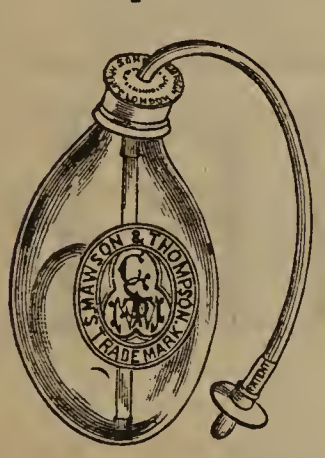

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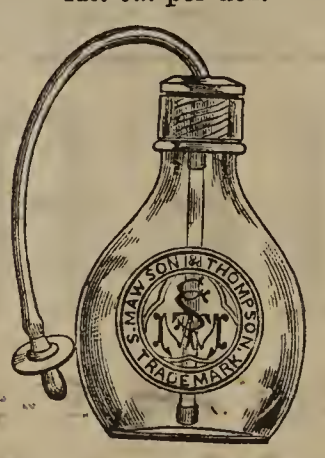

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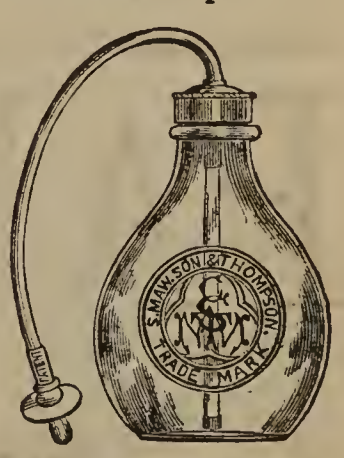

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7 × 6	8 × 7	9 × 8	10 × 9	11 × 10	12 × 11 inches.
6/0	7/0	9/0	11/0	12/6	16/0 per dozen.

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Pure Concentrated
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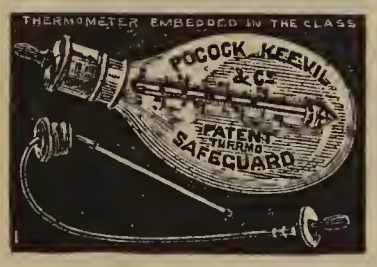

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Being Chemists, they are practically acquainted with the requirements of the trade, and give their *personal attention* to every detail connected with their business.

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For Gout, Rheumatism, Bronchitis, Sore Throats, and Chest Affections.

Sir MORELL MACKENZIE wrote, December 9, 1887.

"I have much pleasure in stating that I have made use of Oleum Pumilionis during the last twenty-five years, and that I consider it a most valuable preparation. It acts as an admirable tonic to the mucous membrane of the air passages in cases of chronic bronchitis and laryngeal catarrh. I am glad, therefore, to hear that the remedy is abeut to be used on a large scale, and I have no doubt the results will be highly satisfactory."

(Signed) MORELL MACKENZIE, M.D.

Pumiline ALONE, with the single exception of Pinol, possesses the physical and chemical properties which give it the faculty of being administered with SAFETY. It is therefore essential for Chemists to use Pumiline, as it is the only preparation obtained from snow-grown Pumilio Pines.

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S. MAW, SON & THOMPSON, ALDERSGATE STREET, LONDON.

A TASTELESS TONIC LAXATIVE GRANULE.

EXACT SIZE.

Bottles containing 25 Pills, 7s. per doz.; Bottles containing 100 Pills, 24s. per doz.

Formula, Aloin, Strychnine, and Belladonna.—McK. & R. Pills.

Aloin	1–5 gr.
Strychnina	1–60 gr.
Ext. Belladonnæ	1–8 gr.

DOSE.—One pill three times a day. Morning, noon, and night. Where a painless peristaltic action is desired by the aged or female patient, one pill may be taken every night or second night at bedtime, as directed by medical attendant.

Since introducing this formula to the profession and adding the granule to our list our sales have been exceedingly large. Over one million were dispensed last year. We have received numerous letters and reports from physicians, speaking in the highest terms of the results of their administration, and thanking us for introducing this granule to their notice.

FROM M.D., M.R.C.P., LONDON, OCTOBER 13th, 1886.

"*These Tonic Laxation Pills can be taken with advantage in those cases* (*mainly female*) *where tonics alone set up strangury from their action upon the vesical centres in the spinal cord.*"

Aloin, Strychnine, and Belladonna Pills are prepared by McKESSON & ROBBINS, NEW YORK, expressly for the use of Physicians and Surgeons, and to be dispensed in Prescriptions.

In this form the ingredients are not only perfectly preserved, but do not affect the teeth, or offend the palate, and, further, can be conveniently kept out of sight by those who object to be regarded as invalids. Complete list mailed free on application. PLEASE SPECIFY McK. & R. PILLS.

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London Agency: Messrs. S. MAW, SON & THOMPSON, 7 to 12, Aldersgate St., E.C.

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CONCENTRATED

PEPTONISED COCOA AND MILK

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PEPTONISED MILK

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SAVORY & MOORE, LONDON.

Tins, 1s. 6d. and 2s. 6d. Obtainable everywhere.

ACID. ACETIC. B.P., ACID. ACETIC. 0·014. Pure, for Vinegar and Pickles.

PEROXIDE OF HYDROGEN, for Bleaching Feathers, Hair, Silk, Jute, Ivory, Bone, &c.

METHYLATED ETHER, 730 for Refrigerators, 717 for Anæsthesia.

PHOSPHORIC ACID CONCENTRATED, B.P. S.G. 1500, and Syrupy 1750.
Guaranteed Pure and Free from Arsenic.

LIQ. FERRI PERCHLOR. FORT., B.P. Free from Arsenic, and Soluble in Spirit.

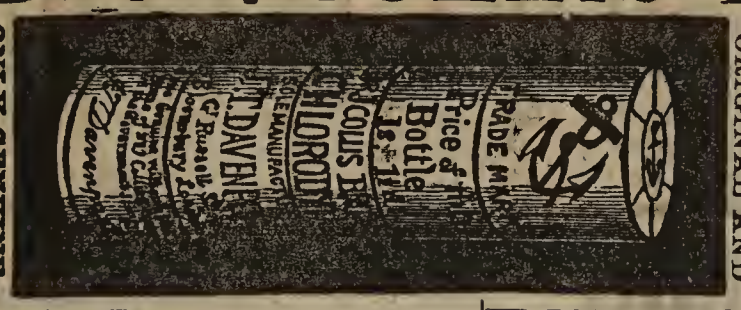
HYPOPHOSPHITES OF LIME, SODA, &c. CYANIDE OF POTASSIUM.

Ferri et Ammon. Cit., Ferri et Quininæ Cit., B.P., and other Scale Preparations.

DUNN & COMPY., Stirling Chemical Works, WEST HAM, LONDON.

THE ORIGINAL AND ONLY GENUINE.

DR. J. COLLIS BROWNE'S CHLORODYNE

ONLY GENUINE.  ORIGINAL AND

IS THE GREAT SPECIFIC FOR CHOLERA, DIARRHŒA, DYSENTERY.

COUGHS, COLDS, ASTHMA, BRONCHITIS.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Dr. J. C. BROWNE (late Army Medical Staff) DISCOVERED a REMEDY to denote which he coined the word CHLORODYNE. Dr. Browne is the SOLE INVENTOR, and, as the composition of Chlorodyne cannot possibly be discovered by Analysis (organic substances defying elimination), and since the formula has never been published, it is evident that any statement to the effect that a compound is identical with Dr. Browne's Chlorodyne *must be false*.

This Caution is necessary, as many persons deceive purchasers by false representations.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Vice Chancellor Sir W. PAGE WOOD stated publicly in Court that Dr. J. COLLIS BROWNE was UNDOUBTEDLY the INVENTOR of CHLORODYNE, that the whole story of the defendant Freeman was deliberately untrue, and he regretted to say it had been sworn to.—See *The Times*, July 13th, 1864.

GENERAL BOARD of HEALTH, London, REPORT that it ACTS as a CHARM, one dose generally sufficient.

Dr. GIBBON, Army Medical Staff, Calcutta, states: "2 DOSES COMPLETELY CURED ME of DIARRHŒA."

From SYMES & Co., Pharmaceutical Chemists, Simla. *Jan.* 5, 1880.

To J. T. DAVENPORT, London.

DEAR SIR,—We congratulate you upon the widespread reputation this justly-esteemed medicine has earned for itself all over the East. As a remedy of general utility, we much question whether a better is imported, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances *ad infinitum* of the extraordinary efficacy of DR. COLLIS BROWNE'S CHLORODYNE in Diarrhœa and Dysentery, Spasms, Cramps, Neuralgia, the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than Collis Browne's, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than Collis Browne's is a deliberate breach of faith on the part of the chemist to prescriber and patient alike.—We are, Sir, faithfully yours, SYMES & CO., *Members of the Pharm. Society of Great Britain, His Excellency the Viceroy's Chemists.*

DR. J. COLLIS BROWNE'S CHLORODYNE is the TRUE PALLIATIVE in NEURALGIA, GOUT, CANCER, TOOTHACHE, RHEUMATISM.

DR. J. COLLIS BROWNE'S CHLORODYNE is a liquid medicine which assuages PAIN of EVERY KIND, affords a calm, refreshing sleep WITHOUT HEADACHE, and INVIGORATES the nervous system when exhausted.

DR. J. COLLIS BROWNE'S CHLORODYNE rapidly cuts short all attacks of EPILEPSY, SPASMS, COLIC, PALPITATION, HYSTERIA.

IMPORTANT CAUTION.—The IMMENSE SALE of this REMEDY has given rise to many UNSCRUPULOUS IMITATIONS. Be careful to observe Trade Mark. Of all Chemists. 1s. 1½d., 2s. 9d., and 4s. 6d.

SOLE MANUFACTURER, J. T. DAVENPORT, 33 Gt. Russell St., W.C.

THE ORIGINAL AND ONLY GENUINE.

IMPORTANT DECISIONS.

Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

FURTHER IMPORTANT NOTICE.

The subjoined list of eminent Firms concur with Vice-Chancellor Sir W. Page Wood's statement in Court that Dr. Collis Browne was undoubtedly the Inventor of Chlorodyne; and that when Chlorodyne, or the Original Chlorodyne, is ordered, they invariably supply Dr. J. Collis Browne's:—

Apothecaries' Hall	London.	Frazer & Green	Glasgow.	Morson, T., & Son	London.
Allen, Hanbury & Co.	,,	Gale & Co.	London.	Newbery & Sons	,,
Baiss Brothers	,,	Giles & Son	Clifton.	Oldham, G., & Co.	Dublin.
Banks & Richards	Birmingham.	Goulding, Messrs.	Cork.	Parsons & Richardson	Leicester.
Barron, Harveys & Co.	London.	Grattan & Co.	Belfast.	Peake, Allen & Co.	Dublin.
Bell, John, & Co.	,,	Grimwade, Ridley	London.	Raimes & Co.	Edinburgh.
Corbyn & Co.	,,	Grindley & Son	Chester.	Sang & Barker	,,
Cox & Gould	,,	Hearon, M'Culloch & Co.	London.	Sanger, J., & Sons	London.
Curling & Co.	,,	Hodgkinson, Tonge & Stead	,,	Sim, James, & Co.	Aberdeen.
Davy, M'Murdo & Co.	,,	Hopkins & Williams	,,	Smeeton, W.	Leeds.
Dobbin, W., & Co., Limited	Belfast.	Hovenden, R., & Sons	,,	Southall & Co.	Birmingham.
Drew, Barron & Co.	London.	Johnson, J. H. & S.	Liverpool.	Sutton, W., & Co.	London.
Drew, B., & Alexander	,,	Langton, W., & Co.	London.	Tomlinson, Hayward & Co.	Lincoln.
Dunn & Company	,,	Lynch & Co.	,,	Treacher, Hodgkinson & Co.	London.
Edwards, W.	,,	Mackay, John, & Co.	Edinburgh.	Westwood & Hopkins	,,
Evans, Lescher & Webb	,,	Mander, Weaver	Wolverhampton.	Woolley, James	Manchester.
Evans, Gadd & Co.	Exeter.	Marsden & Sons	London.	Wyleys & Brown	Coventry.
Ferris & Co.	Bristol.	Maw & Son	,,	Yates & Co.	London.
Foulger, S., & Son	London.	Meggeson & Co.	,,		

After these public statements in a Court of Equity, and subsequent confirmation by the trade at large, no Chemist can conscientiously use or sell any other compound for Chlorodyne, without committing a breach of faith, unjust to patient and physician. The *value* of the remedy *alone* creates the great demand.

Sold in Bottles—1s. 1½d., 2s. 9d., 4s. 6d., and 11s. Usual Discount to the Profession.

SOLE MANUFACTURER,

J. T. DAVENPORT, Pharmaceutist, 33, Gt. Russell St., Bloomsbury Sq., LONDON.

MEDALS, LONDON, 1873.] [PARIS, 1875.

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PURE FULLER'S EARTH

In 56 lb. and 1 cwt. bags, 14/- per cwt.; or in 7, 14, and 28 lb. packages, 16/- per cwt. net, bag included, delivered free in London. (SAMPLES POST FREE.)

STEAM MILLS, FARRINGDON ROAD, LONDON, E.C.

"EMP. HŒMOSTATICUS"

Antiseptic. (REGISTERED.) Styptic.

Constant testimonies are received to the value of this remarkable plaster. 3 yard tins, 8d. per yard; 1 yard tins, 9d. Of all Wholesale Houses.

A. DE ST. DALMAS, LEICESTER,

Maker of Porous Plasters, Adhesive, Belladonna, Mustard, Corn, Court, and all other Plasters. Maker to the British Government.

BURROUGH'S **SPIRITUS RECTIFICATUS, P.B.**

SPIRITS OF WINE CHEMICALLY PURE

The Best English Grain Spirit, free from Fusel Oil.

ALSO FINEST ORANGE WINE AND SHERRY FOR MEDICINAL PURPOSES.

CALE STREET DISTILLERY, LONDON, S.W.

Duty free for Exportation—also best Methylated Spirit at lowest prices.

LOFTHOUSE & SALTMER,

Manufacturing Chemists, Wholesale & Export Drug Merchants,

HULL.

Manufacturers of all Pharmaceutical Preparations on the best and most improved principles.

QUOTATIONS ON APPLICATION.

SOLUT. ÆTHERIS NITROSI (Æther. Hyponit.)

1 part to 5 Sp. Vini Rect. 56 O.P. makes Sp. Æth. Nit. 850.

This concentrated preparation is carefully drawn in our own laboratory, is highly recommended, and is daily finding increased favour with the trade for making Sp. Nitre, as required for use, and thus avoiding the risk of a development of free acid, which is more or less prevalent in Sp. Nitre that has been drawn some time.

Price in Winchester Quarts, 3s. per lb., net.

SOLUBLE ESSENCES.

Specially prepared for Ærated Water Manufacturers, unequalled in Strength and delicacy of flavour as well as solubility.

SAMPLES ON APPLICATION.

SOLUBLE ESS. LEMON,	in Winchester Quarts	3s.	3d.	per lb.
,, ESS. ORANGE,	,, ,, ...	3s.	3d.	,,
,, ESS. GINGER,	,, ,, ...	3s.	3d.	,,

USUAL TERMS

Spiritus Ætheris Nitrosi

Guaranteed to contain the proportion of Nitrous Ether directed by the British Pharmacopœia.

Æther Nitrosus and Sol. Ætheris Nitrosi

Respectively 8 and 4 times the strength of the Spirit.

Spirit. Ammoniæ Aromaticus

Made from Volcanic Ammonia.

JAMES WOOLLEY, SONS & CO.

Manufacturing Pharmaceutical Chemists, MANCHESTER.

ANTIPYRIN TABLOIDS.

LONDON.] JULY 14TH. [1888

Antipyrin Tabloids.

Physiological Action.

(Soluble in two parts of water. It combines with acids to form salts.)

It agrees well with the stomach and intestine, and exerts a decided antiseptic action. The corpuscles change their form, the hæmatin separates, and the blood is tinted chocolate. The heart beats quicker, and there is a sense of warmth. Then the pulse goes down, perspiration follows, and a feeling of chilliness with pallor comes on, the fever lowering several degrees (1 to 5). While normal temperature is not affected by it, "the decline of the febrile heat begins in ten to twenty minutes after the dose has been given, and persists from an hour to sixteen hours or longer, according to circumstances" (Bartholow).

"Antipyrin appears to be free from one source of danger common to the germicide antipyretics—the profound depression, almost collapse, which comes on with the sweating and precedes the next exacerbation of the fever, and in fact ushers it in." Though this much is asserted, there is the qualification that "there occur *in certain subjects*, some cardiac weakness and irregularity" (*Ibid.*).

The drug lessens reflexes and is analgesic. It is eliminated by the kidneys.

Therapy.

As Huchard has well said, "*Antipyrin is an antipyretic, but not an anti-periodic.*" "Antipyrin," says Bartholow, "is an effective remedy for fever, the best, up to the present time, for the relief of that symptom, but is not possessed of any power to alter the morbid condition producing the feverish state." In pyretic states, a great deal seems to depend on how the drug is given. It should not be administered in the intermissions or remissions with sweating, for it may, at such times, upset the stomach and increase the cold sweat. A good way is to give fifteen grains as the fever is coming on, repeating this if need be two or three times in as many hours. The reduction of fever remains for from six to twenty-four hours, and for several days the temperature is not likely to reach its height again. In typhoid fever, Antipyrin "is a safe and efficient antipyretic," but is not alleged to exert any curative effect thereon; the case is similar with pneumonia. "*In no form of febrile disease*," says Bartholow, "*has Antipyrin been so efficient as in acute rheumatism*, and here it maintains the first place as a remedy. In acute rheumatism it is superior to salicylates and to other remedies. From fifteen to twenty grains, every three to six hours, will be required until the cessation of joint pain, and the disappearance of the swelling." As in the case with other drugs, some care is requisite subsequently to guard against a relapse, "and hence persistence is necessary in the use of the remedy for some days after the attack has apparently ceased, but the amount given should be slowly reduced." Some prominent therapeutists affirm that Antipyrin is a periodic in malarial fever, but though this is generally denied, the drug is beyond all question a powerful febrifuge.

While for a long time it was the antipyretic action of Antipyrin that attracted attention, it now appears that the analgesic property of the drug is of most importance. "The remarkable relief afforded by Antipyrin and other members of the group in acute rheumatism led to their use in cases of neuritis, sciatica, and some other painful diseases. We are indebted to Professors Lepine and Huchard more especially, for demonstrating the influence exerted by the agent over certain painful affections. It seems quite clear that the relief given is in maladies due to centric and peripheric lesions of the nerve apparatus—for example, the pains of *locomotor ataxia*, *neuralgia* of the fifth nerve, associated with neuritis, and sciatica due to the same cause." It is also given in megrim, zona, etc.

On account of its power to diminish reflex function, it has been given in epilepsy, whooping-cough, chorea, etc. This property and that of relieving pain, make it valuable in biliary and renal colic, dysmenorrhœa, etc.

It certainly appears to cut short attacks of erysipelas and tonsillitis. Its usefulness in pneumonia has been questioned.

To prevent sea-sickness Antipyrin has been given extensively and with the most satisfactory results, by Dupuy and some others. Many who have tried it in a large number of cases, state that it has never failed them. To check bleeding from the nares, throat, lungs, bowels and genito-urinary tract, and external parts, it has been much praised.

The administration of Antipyrin has occasionally been followed by an insignificant eruption resembling erythema or urticaria. In cases with weak heart the drug should be given with a watchful care. Without doubt it is generally preferable not to administer anything like such large quantities at a time as have sometimes been recommended, the usual dose being from one to four 5 gr. Tabloids. The drug is reputed to agree well with children, to whom as many 1½ gr. doses as the child is years old may be given hourly till the fever is lowered. In the relief of pain, hypodermics of antipyrin have proved most satisfactory, a tabloid or a tabloid and a half being the usual amount for subcutaneous injection.

Tabloids of Pure Antipyrin supplied to the trade in bottles of 25 and 100 at 20/- and 70/- per doz. Retail prices, 2/6 and 7/6 each. Antipyrin Crystals at 3/5 per oz. These prices subject to usual discount.

BURROUGHS, WELLCOME & CO., Snow Hill Buildings, LONDON, E.C.

A WARNING.

1, *London House Yard, London, E.C., March* 20, 1888.

I beg to call especial attention to the case referred to below. In that action the Plaintiff's Manager swore, and his affidavit was in no way disputed, that—

KEATING'S INSECT DESTROYING POWDER

is quite harmless to animals and human beings, and that it does not contain any substance that is poisonous to either.

I take this opportunity of again stating that "KEATING'S POWDER" is a special preparation, different from, and not to be compared with, any so-called Insect Powders which give so much dissatisfaction to customers.

My TRADE MARK, registered October 11, 1876, is—

KEATING'S

PERSIAN

INSECT DESTROYING POWDER.

Any one infringing this I shall at once proceed against, as such a step is as much an injury to the whole trade as myself.

THOMAS KEATING.

In the High Court of Justice.

CHANCERY DIVISION.

MR. JUSTICE NORTH.

26*th October*, 1886.

KEATING *v.* POLL.

IT WAS ORDERED:

That the Defendant be perpetually restrained from stating or causing to be stated that Keating's Persian Insect Destroying Powder contains **any substance poisonous to animals or human beings,** or from making any statement to the effect that such Powder is dangerous to animals or human beings.

IT WAS FURTHER ORDERED:

That the Defendant, William Sheppard Poll, do pay to the Plaintiffs their costs of this Action.

NOTICE *Chemists who make statements to customers defamatory of Keating's Insect Powder will be summarily proceeded against.*

THE ASAFŒTIDA PLANTS.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society of Great Britain.

Notwithstanding the large amount of literature that has already been published on this subject, there appears to exist even at the present day a certain amount of confusion concerning the plants which yield asafœtida. This arises partly from the literature being published in several different languages, partly from the fact that the material existing in herbaria is comparatively small and imperfect and very unequally distributed in different countries, and partly from the remarkable resemblance which exists between species yielding entirely different gum resins. Thus it is almost, if not quite, impossible to distinguish by the leaf alone between *Ferula fœtida*, *F. Narthex* and *Dorema Ammoniacum*. Indeed, *F. Narthex* was received at Kew Gardens under the name of *Dorema Ammoniacum*, and remained so labelled for some time, until the error was observed and pointed out by myself.

Under these circumstances a review of the present state of our knowledge of the plants yielding asafœtida seems desirable, so that the distinctive features of the various species may be more readily compared. That such a comparison is necessary, is indicated by the fact that within the last few months a specimen of an asafœtida plant labelled *Ferula Scorodosma*, but which should have been named *F. fœtidissima*, Regl. and Schm., has been presented to the Herbarium of the Pharmaceutical Society, from Moscow, where, if anywhere, it should have been possible to identify the plant correctly, seeing that more material for the purpose exists in Russia than in any other country in Europe.

The proposed review of these plants is also rendered more easy at the present moment through the recent publication of the valuable information obtained by Dr. J. E. Aitchison* in Afghanistan concerning *F. fœtida*, L., and by the fact that the *F. Narthex* has flowered during the past month in the Royal Gardens at Kew. It has therefore become possible to supplement the descriptions hitherto published by further details which should render the discrimination of the different species less difficult in future.

A number of plants belonging to the genus *Ferula* possess an alliaceous odour, but the actual preparation of commercial asafœtida from these plants has been observed only in the case of a few of them. Nevertheless, it may be advisable to quote in this article sufficient details to enable the species of *Ferula* known to yield an alliaceous juice to be readily distinguished.

The genus *Ferula* presents, as seen in Herbaria, three tolerably well marked types of leaves. In one of these the leaves have leaflets or segments of a ligulate, lancet-shaped or oblong-oval outline; in the second the segments vary in shape and size, being either linear or cuneate, but are more or less patent, *i.e.*, spreading at an obtuse angle to the rachis. In the third the segments are more or less filiform or linear, and spread at an acute angle. Although this mode of grouping of the alliaceous *Ferulas* differs slightly from that given by Boissier ('Fl. Orientalis,' p. 983), and by Dr. Regel in 'Gartenflora' (1878, p. 197), it will be found more convenient for the purpose than one founded primarily on the character of the flowers and fruit, since some of the species flower only once in several years.

In the first group may be placed *Ferula Narthex*, Falconer; *Ferula fœtida*, Regel; *Ferula fœtidissima*, Regel; *Ferula rubricaulis*, Boiss.? and *Ferula teterrima*, Karel. et Kir. In the second, *Ferula alliacea*, Boiss.; and *Ferula persica*, Willd.

Group I.

I. Ferula Narthex, Boissier ('Fl. Orientalis,' p. 994).

Syn. *Narthex Asafœtida*, Falconer (in 'Trans. Linn. Soc.' xx., p. 285).

This plant was discovered by Dr. Hugh Falconer near Boosthon, in the valley of Astore or Hussorah, which is on the northern side of the mountains separating Cashmere from Thibet, and consequently is situated in the latter country. He found it on September 21, 1838, but did not see the flowers, the plant being dried up and in ripe fruit, the leaves withered and the stems damaged by cattle. There were, however, a few partial umbels of barren flowers, with an occasional petal remaining. Some young roots of the plant were therefore carefully removed, and introduced first into the Botanic Garden at Saharunpoor and afterwards transferred to the subsidiary Hill Garden at the Himalayan Station of Mussooree. None of these, however, had flowered at the time Dr. Falconer left India. Fresh seeds, presumably of the same plant from the same locality, were forwarded by a native friend in Cashmere to Dr. Falconer in 1839, and were transmitted to the India House and were distributed to several gardens by Dr. Royle. Some of these seeds, Dr. Falconer was informed, were grown in the Botanic Garden at Edinburgh.*

The leaves, fruit and root collected by Dr. Falconer appear to have been deposited at Kew.†

The plant was not figured by Dr. Falconer, but two plants presumably grown from Dr. Falconer's seeds, flowered in the Edinburgh Botanical Garden in 1858 and flowered and fruited in 1859‡, and a description of these plants was given by Dr. J. H. Balfour, accompanied by two plates, in the 'Trans. Roy. Soc. Edinb.' (vol. xxii., pp. 366, 367 and pl. xx., xxi). The former of these plates (pl. xx.) is copied in Bentley and Trimen's 'Med. Plants,' but this figure was evidently drawn at a period when the inflorescence was by no means fully developed, and does not at all represent the appearance of the plant at a later period. The figure given of the plant in *Bot. Mag.*, No. 5168, has the same defect. This I am able to state by an examination of the plant of *F. Narthex*, which has flowered during May this year in the Royal Gardens at Kew. In an early stage of development the plant presented exactly the appearance depicted by Dr. Balfour; later on, however, it assumed the appearance given in the photograph which has been kindly taken by Mr. Leo Atkinson for this Journal, through the kind permission of the Director of the Royal Gardens at

* 'Trans. Linn. Soc.,' London (2nd series), *Bot.*, vol. iii., pt. 1, p. 68; *Pharm. Journ.*, [3], xvii., p. 465, 466.

* 'Linn. Trans.,' l.c., pp. 288, 289.

† *Bot. Mag.*, 5168.

‡ The fruit ripened in 1839 and was distributed. All the plants raised at Edinburgh are now dead, but the plant still lives at Regents Park Gardens.

Kew (see fig. 1). This appearance is to some extent indicated by Dr. Balfour in the text. His excellent description agrees so fully in all important details with the plant at Kew that there can be no doubt of its identity, although the Kew plant came from Germany. Indeed, the only point of difference noticed is that he states the petals of the barren flowers are oblique and unequal, and acute at the apex. These characters I did not observe in the Kew plant.

Dr. Falconer's original description is as follows :*

"A tall perennial plant, 5 to 8 feet high. Root fusiform, simple or divided, a foot or upwards in length, about 3 inches in diameter at the top, with a dark greyish transversely corrugated surface; the summit invested above the soil with dark hair-like fibrous tegmenta, the persistent exuviæ of former years; cortical layer thick and tough, white or ash-coloured in the section, readily separable from the central core, and, like the latter, abounding in a white, milky, opake, excessively fœtid, alliaceous juice. Leaves collected into a fascicle above the root, numerous, large and spreading, about 18 inches in length in the adult plant, of a light-green colour above, paler underneath, and of a dry leathery texture; the petioles terete, amplexicaul and channelled at the base, trifurcated a little above it, the divisions emitted at an angle with each other, like the legs of a tripod, and bipinnately sected; the leaf-segments linear-lingulate, more or less obtuse, entire or sinuately lobed, variable in their offset, being either alternate or opposite, for the most part unequal-sided, and decurrent along the divisions of the petiole, forming a narrow winged channel upon the latter. Midrib prominent on the under side; veins slender and anastomosing by numerous reticulations. The leaves observed on a young growing plant were about 9 inches in length, the leaf-segments being from 2 to 4 inches long by 4 to 6 lines in width. Stem erect, terete, simple, striated, about 2 inches in diameter at the base, solid throughout, the spongy medulla being traversed by scattered, tough, fibrous bundles of vessels; invested with alternate, vaginating, dilated, aphyllous petioles, and terminating in a luxuriant head of compound umbels. General as well as partial involucra entirely wanting. Umbels 10- to 20-rayed, emitted from the dilated spherical head of a common peduncle, the rays 2–4 inches in length. Partial umbels with very short rays aggregated into round capitula varying from 10 to 20 rays in the fertile, and from 25 to 30 in the barren umbellulæ. Flowers small; barren generally mixed up with the fertile flowers (?). Border of the calyx obsolete, being reduced to very minute denticular points. (Petals in the barren flowers small, oblique, unequal-sided, acute, without an elongated acumen (?).) Stylopodia urceolate and plicated, with a sinuous margin. Styles filiform, reflected on the ripe fruit, rather short and slender, attached by a broad base. Fruit: from 7 to 15 ripening on the partial umbels, supported on short stalks. Mericarps varying from broad elliptical to elliptical obovate, 5–6 lines long by 3 to 4 lines broad, flat, thin, foliaceous, but somewhat convex in the middle, with a dilated border, generally unequal-sided, of a dark reddish-brown towards the centre, lighter towards the margin, perfectly smooth, with somewhat of a glossy surface. Dorsal primary ridges 5; the three middle ridges filiform, slightly crested towards their confluence at the apex; the lateral ridges more obsolete, situated close to the margin, immersed in the substance of the border, but distinctly seen on the surface of the commissure, and confluent with the middle nerve of the latter. The dilated borders as wide as the space occupied by the three middle ridges. Vittæ in the dorsal furrows large and broad, occupying the entire width of the valleculæ, stretching from base to apex, usually solitary, but sometimes double in one or other of the middle furrows, and generally double or dichotomous with a a small branch in the broadest side of the margin, turgid with a fœtid juice: vittæ of the commissure ranging from 4 to 6, very unequal and variable: one very slender vitta, which is frequently dichotomous in two fine threads confluent at the apex, being placed close on either side of the middle nerve; another of the size of the dorsal vittæ situated more outwards, and a third at the inner side of the dilated border, over the edge of the seed, more slender, but frequently subdivided and interrupted so as to cover the border with a beautiful network of anastomosing ramifications. Seed flattened, with plane albumen. Carpophores bipartite, persistent, twice the length of the pedicels. Flowers white (?)."

* 'Linn. Trans.,' p. 285–287.

Dr. Balfour's description, taken from the living plant, is here given :*

"The following description is taken from the plants which were grown in the Botanic Garden:—Herbaceous plants attaining a height of between 9 and 10 feet, and giving out a strong alliaceous odour when any part is bruised. Flowering stem erect, terete, striated, about a foot in circumference at the base, giving off flowering branches bearing compound umbels. After the plant flowers and fruits it dies, but the period of flowering is often long delayed. In the case of the plants in the Botanic Garden it was postponed for sixteen years. It is therefore a monocarpic plant, with the period of flowering indefinite. The cotyledons are linear, from 2 to 2½ inches in length. The roots are large and thickened, fusiform, dark-coloured externally, and white within, about a foot and a half in length, and about a foot in circumference at their thickest part, exhaling a very strong and enduring asafœtida smell. Some of them were laid for a few weeks in a room last year, and, although removed five or six months ago, the odour still remains. The crown of the roots is covered with a mass of fibrous matter. During the first year of growth, the root attains the thickness of the thumb. It continues to increase annually, and sometimes attains the thickness of a man's calf, or even his thigh. The radical leaves, which are the only ones produced on non-flowering specimens, are about 18 inches in length, but in flowering specimens they are smaller; they are bipinnately cut, and have a pæony-like appearance; the segments are linear, ligulate, and obtuse, entire or sinuately lobed. The lower leaves in the fruiting plant had compound laminæ 13 or 14 inches long, borne on evident rounded petioles, which, at the base, had short sheaths, nearly surrounding the whole stem; the lowest four leaves did not bear umbels in their axil; all the rest did. In proceeding upwards on the flowering stem, the laminæ diminished in size, while the sheathing part of the petiole or the pericladium increased—the laminæ becoming 3½ or 4 inches long, the sheaths 7 to 9 inches in length by 8 in breadth. In the upper part of the axis the sheathing petiole represents the whole leaf; and the sheaths near the top are reduced to abortive membranous scales, about 1 inch in length, and finally disappear, when the umbels at the summit are reached. The large sheathing inflated petioles gave a peculiar character to the plants. The petioles divided in a trifurcate manner. From the axils of the petioles compound umbels were produced. The largest flowering branch was 19 inches long, and the others varied from 6 to 12 inches. The umbels had neither involucre nor involucel. The rays of the general umbels varied in length from 2 to 2½ inches, and in number from thirty to fifty. Besides the fructiferous umbels, there were

* 'Trans. Roy. Bot. Soc. Ed.,' p. 366.

others below them which appeared first in a globular form, and the flowers of which were unisexual; usually male, and sterile. The peduncles bearing these barren umbels were very long, and they sometimes exhibited small bractlets at their base. Similar bractlets were seen occasionally on the other peduncles. The limb of the calyx was obsolete—a mere rim with five slight projections or denticular points; petals yellowish, somewhat ovate, entire, one of them with the point inflexed. In the barren flowers, the petals were oblique and unequal, and acute at the apex. Stylopode urceolate and plicate, with a sinuous margin. Styles filiform, at length recurved and deflexed. Fruit, with single vittæ in the dorsal valleculæ; occasionally in the lateral valleculæ the vittæ were more than one, and divided."

To these I am able to add the following description of the plant at Kew, as seen when the petals of the fertile umbels had fallen.

The specimen at Kew in the early stage of the development of its inflorescence presented exactly the pyramidal outline of the plant figured in Bentley and Trimen's 'Materia Medica,' as if the

Fig. 1.—*Ferula Narthex*, Boiss., in flower, as grown at Kew.

lateral branches each terminated in a dense umbel. But at a later date the peduncles of the umbels elongated and gave rise in a sympodial manner to other stalked umbels, and the upper branches even to a third series, so that by the time the young fruit had begun to form the inflorescence assumed quite a different aspect (see fig. 1). The plant was then about 5½ feet high and 3½ feet in diameter; the stem about 3 inches in diameter at the base, tapering to about 1 inch at the apex. A careful examination of the plant showed that Dr. Trimen's description (which was not taken from the fresh plant, but compiled from Balfour and Hooker's descriptions), needs to be amended in several particulars.

The petioles of the leaves vary considerably in length, the lowest leaves, about eight in number, having a petiole 6 to 9 inches in length, decreasing rapidly in successive leaves to 3 inches, 2 inches and

1 inch, the pericladium enlarging in proportion as the length of the petiole decreases, and being about 6 inches long by about ½ in. broad in the middle of the plant, and the leaves becoming gradually smaller and smaller, so that on the upper half of the stem only the pericladia are developed beneath each umbel. The peduncles decrease in length from 20 inches in the lower half of the plant to 10 inches in the upper half, and are rounded below but slightly flattened above (as seen in transverse section), spreading almost horizontally below, but becoming erecto-patent towards the upper part of the stem. Each peduncle terminates in a crowded umbel bearing fertile flowers; these umbels are subtended with a variable number of smaller umbels on peduncles about 6 inches long, and thus exceeding the original umbel, whose rays are only 2 to 3 inches long. These secondary umbels are about sixteen in number in the lowest branches, decreasing to five in number in the middle of the plant and to two or only one in the upper part. The secondary umbels are in the latter case frequently subtended by a single tertiary umbel which flowers still later. In the lower secondary umbels the tertiary umbel is sometimes developed imperfectly as a small globose cluster of flowers just at the base of the secondary umbel. The secondary umbels, where numerous, as in the lower branches, are frequently arranged in an irregularly spiral manner immediately below the primary umbel. The secondary umbels of the lower third of the stem are furnished both at the base of the peduncles and at the base of the umbels, with a bract which is concave and slightly twisted, resembling a diminutive pericladium. In the upper half of the plant the outer flowers of the secondary umbels are furnished with styles and stamens; a few yield fruits, but the central flowers bear stamens only around a flattened disk without styles. In the tertiary umbels the flowers are either all male or a few of the outer flowers have shorter pedicels and bear styles. The styles are always quite erect at first, and only diverge and become reflexed after fertilization and when forming fruit. The calyx is scarcely visible save as a thickening of the upper part of the fruit, with five minute triangular yellowish points, visible only under a lens. The petals are all yellow, those of the female flowers falling very quickly; only those of the male flowers remained on the plant when seen by me. The petals of the male flowers are oblong lanceolate and slightly obtuse and concave. The anthers, incurved at first, are innate. The pedicels and peduncle of the umbels have quite a yellowish tinge, becoming more green when the fruit begins to form. The ultimate segments of the leaves are remarkably concave when young, greyish silky with short hairs below, but have a somewhat varnished appearance as if glabrous above. Under a lens, however, the upper surface is seen to be dotted over with extremely short hairs which are little more than projecting points. The juice when first exuded is white and soon concretes into a mass of cheesy consistence. It will thus be seen that the plant differs considerably in the upper and lower part in the development of the different organs, and also varies greatly in appearance and habit in different stages of its growth, so that the figure already quoted is not sufficiently characteristic of the appearance of the plant.

(*To be continued.*)

CHEMICAL NOTES ON TEA.

BY DR. B. H. PAUL AND A. J. COWNLEY.

In the experiments made some time since and recorded in the paper "Chemical Notes on Tea" (*Pharm. Journ.*, [3], xviii., 417), it was found that in the small quantities of tea, merely 5 grams, then operated on, no evidence could be obtained of the presence of theobromine, and we were so far unable to arrive at any definite conclusion as to the opinion expressed by Liebig and Zöller, that an alkaloid which they found in a sample of Himalayan tea was none other than theobromine. Shortly after the publication of our paper we were enabled, by the courtesy of Messrs. Gow, Wilson and Stanton, to obtain an authentic sample of Himalayan tea, and were thus placed in a position to examine this point more definitely by operating on a much larger quantity of material than is necessary when merely carrying out the determination of the theine in tea. The weight of tea taken for examination was 200 grams, and it was treated in the same way as described by us for the determination of theine.

The hot alcoholic solution gave on cooling a deposit weighing 2·08 grams, but this was found on examination to consist chiefly of wax and chlorophyll with only a trace of theine. It was in such a deposit that Liebig and Zöller found the substance which they considered to be theobromine, but in our examination of the tea above mentioned we were unable to obtain any evidence of the presence of that alkaloid.

After the whole of the theine had been extracted from the acidulated solution by frequent agitation with chloroform, in the manner suggested in our previous paper, the solution was made alkaline with potash, and again shaken several times with chloroform. On evaporation of the chloroform solution a very small quantity of a yellow and apparently amorphous alkaloid was obtained that dissolved readily in acid and was reprecipitated by potash. It was almost insoluble in hot water, but readily soluble in ether, and the fact of its ready solubility in ether proved it to be neither theine nor theobromine. The quantity obtained from 200 grams of tea was so very small that we decided to defer any mention of our observation until a further quantity of the same kind of tea could be obtained sufficient for ascertaining the nature of this alkaloid more particularly, and we are now engaged upon this work.

The account which appeared in *Nature* last week of a recent communication made to the Berlin Physiological Society induces us, however, to make known the fact that we had some months ago obtained distinct evidence of the presence in tea of an alkaloid differing from theine. From that account it appears that Professor Kossel has obtained from tea a base to which he has given the name "theophyllin," and that he has been able to ascertain that it is an isomer of theobromine, but differing from the latter by a series of well-marked chemical reactions. No description is yet given of the characters of this base, and it is therefore impossible to say whether or not it is identical with the base we had obtained in the manner above described. The quantity at our disposal was too small to admit of the determination of anything more than the physical characters above mentioned.

Laboratory, 13, *Fenchurch Avenue.*

The Pharmaceutical Journal.

SATURDAY, JULY 14, 1888.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE RESEARCH LABORATORY.

IT will be seen by reference to our advertisement columns that the Committee which is entrusted with the arrangements for carrying out the objects of the Society's Research Laboratory has now decided upon the regulations that are to be observed by those who desire to avail themselves of the advantages afforded by this Laboratory. Notice is also given that in October next there will be six vacancies for workers in the Research Laboratory, and that applications for admission are to be addressed to the Director of the Laboratory, at 17, Bloomsbury Square. These applications should include a full statement of the applicant's qualifications, and it may be useful to point out that according to the regulations that have been made, any person who wishes to pursue an investigation on his own account, or to assist in the researches undertaken by the Director, may be admitted into the laboratory as a worker. For that purpose, however, it is requisite that he should be nominated by the Director of the Laboratory as the result of an application to him to that effect. Admission to the Laboratory is to be limited in all cases to one year, and those who may desire to continue their work for a longer period must renew their application at the end of the year. Each applicant for admission will be expected in the first place to satisfy the Director of his competency to make proper use of the facilities afforded, and if he should desire to undertake any particular investigation he will also be required to furnish a written statement of its nature and extent. The only restrictions in this respect are that the projected work shall not have a direct commercial object, and that it shall receive the approval of the Director of the Laboratory and of the Committee charged with its control, while in general the selection of subjects for investigation is to be left to the discretion of the Committee, assisted by the Director.

In the practical work of this department the utmost freedom in the selection of methods of research is to be allowed to each investigator, so far as may be consistent with the orderly government of the Laboratory. Each worker will be provided with a supply of gas and water, and at the discretion of the Director with such materials and apparatus as may be requisite for the investigation in hand, but everyone will be expected to reinstate any apparatus that he may damage on being called upon by the Director to do so. With this single exception the workers will be free from any expense. Power is reserved for the Director of the Laboratory to suspend any work in case there should be sufficient cause for doing so, but any worker subjected to such prohibition will have a right of appeal to the controlling Committee, whose decision is to be final.

As regards the results obtained in any investigation carried out in the Research Laboratory, publication of them is to be subject to the sanction of the Committee or the Director, and in all cases of publication the papers are to bear the indication that they are communications from the Research Laboratory of the Pharmaceutical Society of Great Britain.

A NEW PHARMACOPŒIA.

A SECOND edition of the Pharmacopœa Hungarica forms the latest addition to the series of official medicine books. It follows its predecessor after an interval of sixteen years, and is the work of a committee of eight experts, of whom two, Dr. B. MÜLLER and Mr. GUSTAV JÁRMAY, are pharmacists in actual practice. In its form and typographical arrangement it resembles the second edition of the Pharmacopœa Germanica, but it differs from that work in the text being bilingual, arranged so that of two facing pages the one on the left hand is in the Hungarian and that on the right in the Latin language. The old pharmacopœia has been thoroughly re-edited, and the method of working followed by the editors, as set out in the "Preface," may form the subject of this preliminary notice.

In the first place the articles are arranged in alphabetical order according to the Latin designations placed at the heads of the articles in both the Hungarian and the Latin text. The nomenclature of the chemical substances is in the main identical with that followed in the German Pharmacopœia, involving the use, unfamiliar to the British pharmacist, of such terms as chloratum, bromatum and iodatum as equivalents to chloride, bromide and iodide. The vegetable drugs, on the contrary, are not grouped, as in that work, according to the parts used, but are arranged according to the initial letters of the names of the mother plants. Of synonyms only the most frequently used are given. In the selection of articles consideration has been given not only to purely scientific claims, but also to the requirements of practice. In cases where products of different quality occur in commerce the best quality has always been adopted. Directions for the preparation or purification of chemicals have been given only in cases where a

home-made preparation on the small scale might present advantages, or when the compound is easily prepared or one subject to rapid alteration. But especial care has been taken in the exact description of the most characteristic physical properties of the preparations, the tests for their identity and particularly the recognition of impurities and sophistications. In respect to tests depending upon the use of precipitants three degrees of results are recognized,—"non permutetur," "vix perturbetur," and "precipitatum non præbeat." The concentration of acids, solutions and very potent preparations is regulated upon the decimal system, so that the amount of active constituent in a given preparation corresponds to 0·1, 1·0, 5·0, 10, 20, 25 or 50 per cent. As far as possible also such preparations are brought into uniformity with similar preparations in other pharmacopœias. Temperatures are indicated in degrees Celsius and the normal temperature is taken at 15° C. The unit of weight is the gram and that of volume is the cubic centimetre.

The editors have also drawn up some general rules that will apply to the keeping and dispensing of medicines. Substances marked in the Pharmacopœia with one † ("*separanda*") or with two †† ("*venena*") are only to be dispensed upon the prescription of a qualified medical man, but those not so marked may be supplied without restraint. When a medical man intends to prescribe in excess of a maximum official dose he is required to confirm his intention by the addition of a (!). If a preparation ordered is contained in the present edition of the Hungarian Pharmacopœia only one prepared accordingly must be dispensed; if the preparation be non-official in that work, but official in the first edition or in the Austrian Pharmacopœia, then that work in which it is official becomes binding. In other cases, the preparation used must be of the best quality. Should a medical man order a preparation official in more than one state of concentration, or in both a crude and a purified condition, without specifying particularly which he intends, in the one case the more dilute and in the other the more pure preparation is always to be used. Lastly, all the reagents mentioned in the Pharmacopœia are ordered to be kept prepared in the pharmacy.

BILL TO AMEND THE LAW RELATING TO WEIGHTS AND MEASURES.

LATE as it is in the session a Bill has been introduced into the House of Commons by the President of the Board of Trade to amend the law relating to weights and measures, some of the clauses of which are of especial interest to chemists and druggists. The first clause, for instance, provides for the verification and stamping all weighing instruments used in trade, and extends to such instruments certain of the provisions in the existing Act relating to weights and measures. The second clause gives power to the Board of Trade to provide for the local verification of metric weights and measures, and the fifth clause gives the Board power to cause to be made and verified such new denominations of standards for the measurement of electricity, temperature, pressure or gravities as may appear to it to be required for use in trade. The seventh clause gives the Board of Trade power by its officers to compare and verify weights and measures that are not standards, and to test weighing or measuring instruments, and to charge such fees for doing so as may be from time to time approved by the Treasury. This applies to weights and measures and weighing or measuring instruments that are not used for purposes of trade. The eighth clause provides that every local or other authority within the meaning of the principal Act having power to appoint inspectors of weights and measures, shall make regulations subject to the approval of the Board of Trade, for the guidance of inspectors, and it gives the same authorities power to amend such regulations. The points to which these regulations are to relate are the procedure to be observed in the verification and stamping, and in the inspection of weight measures and weighing instruments, and if any such authority fails to comply with this requirement the Board of Trade is empowered to make and enforce the regulations needed. The ninth clause provides that no person who is a maker or seller of weights or measures, or a scale maker, shall hold the office of inspector of weights and measures. It further provides that an inspector of weights and measures may, if it is found desirable, act as an adjustor of weights, measures, or weighing instruments, and when authorized to do so may make approved charges for doing so. The twelfth clause of the Bill provides for the extension of the provisions of the principal Act as to the verification of local and working standards to the standards used by local authorities in testing gas meters. And by the thirteenth clause of the Bill it is provided that a person using weights and measures in the city of London shall not be required to have his weights and measures verified or stamped by more than one authority. The remainder of the Bill relates to the conditions under which coal and bread are to be sold, and to the powers of inspection by which the sale of those commodities is to be controlled. Appended to the Bill is a schedule of fees to be charged in respect of the verification and stamping of weights, measures and weighing instruments. As regards apothecaries weights the fee for verification and stamping each weight from 10 oz. to 1 oz. is twopence and for each weight from 4 drachms to half a grain one penny. For apothecaries' measures the fee varies from sixpence to twopence for each measure. For the verification of weighing instruments, such as balances, scale beams, steelyards and moveable weighing machines the fee is from sixpence to twopence, according to their weighing capacity.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

July 10, 1888.

The following are the questions that were set for the Preliminary examination on that date :—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. (*For all Candidates.*) *Translate into Latin :—*

1. The boys will come that they may see the battle.
2. My son, give this book to Titus thy brother.
3. The city being taken, the citizens fled.
4. We know that Cæsar conquered the Gauls.
5. The ambassadors spoke so wisely that they were praised by all men.

II. Translate into English either A. (Cæsar) or B. (Virgil).

(*Candidates must not attempt both authors.*)

A. Cæsar.

1. In eo itinere persuadet Castico, Catamantaledis filio, Sequano, cujus pater regnum in Sequanis multos annos obtinuerat, et a senatu populi Romani amicus appellatus erat, ut regnum in civitate sua occuparet, quod pater ante habuerat; itemque Dumnorigi Aeduo, fratri Divitiaci, qui eo tempore principatum in civitate obtinebat ac maxime plebi acceptus erat, ut idem conaretur, persuadet, eique filiam suam in matrimonium dat. Perfacile factu esse, illis probat, conata perficere, propterea quod ipse suæ civitatis imperium obtenturus esset; non esse dubium quin totius Galliæ plurimum Helvetii possent; se suis copiis suoque exercitu illis regna conciliaturum, confirmat.

2. Qui se ex his minus timidos existimari *volebant*, non se hostem *vereri*, sed angustias itineris et magnitudinem silvarum, quæ inter eos atque Ariovistum *intercederent*, aut rem frumentarium, ut satis commode supportari *posset*, timere dicebant. Nonnulli etiam Cæsari renuntiabant, quum castra moveri ac signa *ferri jussisset*, non fore dicto audientes milites, neque propter timorem signa laturos.

Grammatical Questions.—For those only who take Cæsar.

1. Decline, in the singular, *eo itinere* and *totius Galliæ*; in the plural, *suo exercitu*. (Par. 1.)
2. Give the principal parts of the verbs in italics. (Par. 2.)
3. Parse, fully, *quæ*, *jussisset*, *fore*, *audientes*. (Par. 2.)
4. Write in Latin—11, 23, 37, 86, 2*nd*, 17*th*, 39*th*; and decline *tres*.

B. Virgil.

1. Olli subridens hominum sator atque deorum
Vultu, quo cœlum tempestatesque serenat,
Oscula libavit natæ; dehinc talia fatur:
Parce metu, Cytherea; manent immota tuorum
Fata tibi; cernes urbem et promissa Lavini
Mœnia, sublimemque feres ad sidera cœli
Magnanimum Æneam; neque me sententia vertit.

2. Postquam introgressi, et coram data copia fandi,
Maximus Ilioneus placido sic pectore *cœpit*:
O Regina! novam cui condere Jupiter urbem,
Justitiaque *dedit* gentes frenare superbas,
Troës te miseri, ventis maria omnia vecti,
Oramus; *prohibe* infandos a navibus ignes;
Parce pio generi, et propius res *aspice* nostras.
Non nos aut ferro Libycos populare Penates
Venimus, aut raptas ad litora *vertere* prædas:
Non ea vis animo, nec tanta superbia victis.

Grammatical Questions.—For those only who take Virgil.

1. Decline, in the singular, *placido pectore* and *pio generi*; in the plural, *gentes superbas*. (Par. 2.)
2. Give the principal parts of the verbs in italics. (Par. 2.)
3. Parse, fully, *olli*, *metu*, *tibi*, *feres*. (Par. 1.)
4. Write in Latin—11, 23, 37, 86, 2*nd*, 17*th*, 39*th*; and decline *tres*.

ARITHMETIC.

(*Time allowed—from* 12·30 *p.m. to* 2 *p.m.*)

[The working of these questions, as well as the answers, must be written out in full.]

1. A man bought 1000 yards at 3*s.* 7¼*d.* per yard, and sold the whole at a profit of 2¼*d* a yard. Find the whole amount received, and the total gain.
2. A man said that he would each year spend half his income, save a third, and devote a fourth to his business. His income was £780 a year. Point out his blunder, and divide his income rightly in the same proportions.
3. Express 2·416̇ as a vulgar fraction, and divide ·072108 by 4·006.

*4. Give the equivalent of a décimètre in inches. Find, approximately, the number of solid inches in a cube the length of whose side is a décimètre.

*5. A barrel containing 90 litres of liquid weighs 36 kilog. 5 hectog.; empty, it weighs 7 kilog. 7 hectog. Find the weight of one litre of the liquid, and the value of 1 centilitre at the rate of 2½*d.* for 1 gram.

6. A person is able to perform a journey of 142·2 miles in 4½ days when they are 10·164 hours long; how many days will he be in travelling 505·6 miles when the days are 8·4 hours long?
7. If 9 per cent. be lost by selling a thing for £78. 15*s.*, what will be gained or lost per cent. by selling it for £90?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*)

1. Enumerate the different forms of the present tense in English, and give illustrations of each form.
2. Analyse the following sentence :—

"*All* desp'rate hazards courage do create,
As he plays *frankly who* has least estate;
Presence of mind and courage in distress,
Are *more than* armies to procure success."

3. Parse fully the words in italics in the sentence above. (Question 2.)
4. In the following passage supply the necessary capital letters, and put in the stops and inverted commas where requisite :—he went straight up to the ambassador of england and said to him in a state of extreme agitation my lord have you news from england then without scarcely awaiting a reply he continued you wish for war then no general replied the ambassador with much deliberateness of manner we feel too much the advantages of peace you wish for war then continued the first consul in a very loud tone of voice we have fought for ten years you wish then that we should fight for ten years to come how can they dare to say that france is arming itself they have imposed upon the world.

†5. Write a short composition on *one* of the following subjects :—

(i.) The Responsibilities of Wealth.
(ii.) Emigration.
(iii.) How a Channel Tunnel would affect this country.
(iv.) "God made the country, but man made the town."

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* At least one of these two questions must be attempted by every candidate.

† This must be attempted by every Candidate.

JACOB BELL SCHOLARSHIPS AND REDWOOD SCHOLARSHIP, 1888.

The following are the questions that were set for the Jacob Bell Scholarships and Redwood Scholarship Examination held on the 10th inst.:—

Time allowed, three hours (11 *to* 2).

In awarding marks the neatness and legibility of the writing will be taken into account.

Notice.—In framing Answers, Candidates should not enlarge upon the Questions, but should confine themselves to giving, as briefly and clearly as they can, the information required.

Latin.

1. Translate into English—

Hic ubi delati portus intravimus, ecce
Læta boum passim campis, armenta videmus
Caprigenumque pecus, nullo custode, per herbas.
Irruimus ferro, et divos ipsumque vocamus
In partem prædamque Jovem, tum litore curvo
Exstruimus toros, dapibusque epulamur opimis.
At subitæ horrifico lapsu de montibus adsunt
Harpyiæ, et magnis quatiunt clangoribus alas:
Diripuent dapes, contactuque omnia fœdant
Immundo; tum vox tetrum dira inter odorem.
Rursum in secessu longo sub rupe cavata,
Arboribus clausi circum atque horrentibus umbris
Instruimus mensas, arisque reponimus ignem.

—Æneid, Lib. iii., 219—231.

2. Parse *delati*; give perfect and supine of *irruimus*; give an account of *dapibus* and decline the word; give infinitive, perfect and supine of *quatiunt* and *instruimus*; parse *clausi*; why does *sub* govern the ablative case *rupe*? decline *rupes*.

3. Translate into Latin—

"Take of citrate of iron and quinine, one and a half drachms; of spirits of chloroform, one drachm; of tincture of orange, half an ounce; of water, to eight ounces. Two tablespoonfuls to be taken twice a day in the same quantity of water, two hours after meals."

"The plaster, to be applied to the neighbourhood of the heart."

"One pill at midday, and one at bedtime."

English.

Write a short essay on "The Battle of Waterloo" or on "A Country Walk in Spring."

Explain and illustrate by a different mode of expression the use and varying meanings of "shall" and "will" in the following sentences:—"I shall fall." "You shall not go." "I will come presently." "I will not carry out your orders."

Arithmetic.

1. How many cubic centimetres are there in one and a half imperial pints, the gallon being taken as 277 cubic inches and the centimetre as 0·3937 linear inch?

2. A man buys 1 cwt. 3 quarters 9 pounds of an article at £1 5*s.* 9*d.* per cwt., how much does it cost him, and what will be his profit on the whole if he sells it at 4½*d.* per lb.?

3. Add $\frac{24}{45}$ to $\frac{67}{117}$ and multiply the sum by $5\frac{29}{67}$. Express the result as a decimal to the fifth place.

4. If 27 men can cut a tunnel in 45 days 6 hours, working 8 hours a day, how long will it take 38 men to do so, working 6½ hours a day?

French or German.

The candidate is at liberty to choose either French or German, and is not required to show a knowledge of both. Marks will only be awarded for one.

French.

Translate into English:—

Cependant il arriva que le marchand perdit toute sa fortune, et il ne lui resta qu'une petite maison de compagne, bien loin de la ville. Il dit pleurant à ses enfants qu'il fallait aller demeurer dans cette maison, et qu'en travaillant comme des paysans, ils pourraient y vivre.

Ses deux filles aînées répondirent qu'elles ne voulaient pas quitter la ville; qu'elles y avaient plusieurs admirateurs, qui seraient trop heureux de les épouser quoiqu'elles n'eussent plus de fortune. Les bonnes demoiselles se trompaient; ces messieurs ne voulurent plus les regarder quand elles furent pauvres. Comme personne ne les aimait à cause de leur fierté on disait "Elles ne méritent pas qu'on les plaigne; nous somme bien aisés de voir leur orgeuil abaissé; qu'elles aillent faire les grandes dames en gardant les moutons."

Contes de Fées. "La Belle et la Bête."

German.

Translate into English:—

MARSILIUS, ODER DIE HOLZFAHRT.

Zur Zeit als die Römer an den Ufern des Rheines herrscheten, war Köln von einem romischen Kaiser belagert. Marsilius, der Stadthalter von Köln, ein sehr kluger und gewandter Mann suchte, da er es mit Gewalt nicht konnte, die Stadt durch List zu retten. Auf seinen Befehl musten sich alle Frauen bewaffnen, und mit Karren zur Stadt hinausziehen, als wenn sie im nahgelegenen Walde Holz zu fällen gedächten. Dieser Auschlag wurde ausgeführt, und kaum hatten sich die Frauen mit ihren Karren im Felde gezeigt, als das Heer der Belageren ihnen gleich nachsetzte, um sie zu fangen oder niederzumachen. Jetzt eilten die übrigen Bürger Köln's, Marsilius an ihrer Spitze, am entgegengesetzten Thore hinaus, und fielen dem Feinde in dem Rücken; der jetzt von beiden Seiten hart angegriffen wurde, den auch die Frauen hatten sich tapfer zur Wehre gesetzt.

Die Belagerer wurden in die Flucht getrieben, und selbst der Kaiser gefangen in die Stadt geführt.

"Legends and Tales of Kôln," 1826.

Time allowed: Two hours (3 *to* 5).

Chemistry and Pharmacy.

1. State the composition by volume of the following gases:—Hydrochloric acid, water, ammonia, and marsh gas; and the relative volume weight of each. Hydrogen = 1.

2. Expand fully the information conveyed by each of the following formulæ:—HI, H_2S, PH_3, CCl_4.

3. Name the materials you would employ, and the quantities necessary to obtain 1000 litres respectively of hydrogen, oxygen and nitrous oxide, at standard temperature and pressure, expressing by an equation the reaction taking place in each case.

4. Describe and explain the B.P. process for the formation of lead plaster, and name those plasters into the composition of which it enters.

5. How much liquid extract of cinchona can be prepared by the official process from 10 lbs. of bark, containing 6 per cent. total alkaloids.

Botany.

1. Describe the chief modes of cell formation, indicating that which is of the most common occurrence.

2. Define a "mixed" inflorescence, cyme, and verticillaster, and show how a cone differs from a strobile.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 4th inst.

Present—The President, Mr. J. E. Brunker, M.A. (in the chair), the Vice-President (Mr. Draper), Dr. Collins, Sir George Owens, Messrs. Allen, Beggs, Grindley, McCormack, Doran, Hayes, and Simpson.

A letter was received from Dr. J. W. Moore, Secretary

of the King and Queen's College of Physicians, stating that the President and Fellows approved of the provisions of the Pharmacy Act (Ireland), 1875, Amendment Bill, and had petitioned the House of Lords in its favour.

Sir George Owens: Did you hear from the Apothecaries' Hall?

The President: Yes. Their petition in favour of the Bill has been presented in the House of Lords, and I have another for presentation in the House of Commons.

A letter was next read from a member of the Society complaining of a breach of the Pharmacy Act.

The President remarked that the case alleged in the letter suggested a further amendment in the 15th section of the Bill before Parliament.

The Vice-President said the proposal was well worthy of consideration.

The President said that without some provision of the kind there might be considerable difficulty in enforcing the other provisions of section 15. A person applied to for the name of his manager might give the name of some individual who was not in the place at all.

It was ordered that the writer of the letter should be informed that the case he mentioned was provided for in the new Bill, and that the point he suggested would receive further consideration.

A letter from Sir William B. Kaye, Q.C., Clerk to the Privy Council, was read, stating that the Order in Council approving of the new Preliminary curriculum could not now be altered or postponed.

The President said he was very glad that this communication had been received, as it would put a stop to their making regulations one day and setting them aside afterwards. The regulation establishing the new Preliminary curriculum was passed by the Council after considerable discussion, and was then sent to the Privy Council, who affirmed it. The next step taken by the Council of the Society was to postpone the operation of it for three months. The Privy Council had said "no" to that. The Preliminary examination on Monday last was held under the new system, and evinced a decided improvement. The examiner gave a paper on English grammar, which was not previously set, but which was a very necessary test for young men coming into the profession.

A letter from Dr. Jacob, Secretary to the Royal College of Surgeons, addressed to the President, was read, stating that the Council of the College had remitted the communication addressed to it by the Council of the Society, on the subject of the Pharmacy Act Amendment Bill, to the Parliamentary Committee to take such action thereon as that Committee should deem advisable.

The President then reported the progress that had been made in the promotion of the Pharmacy Act (1875) Amendment Bill. To put it shortly, on the previous night the Bill was read a third time in the House of Lords in a shape which he considered to be a very great improvement on the Bill that they had originally drafted. The members of the Council were already aware that at the request of the Government, and especially of Mr. Balfour, the Bill was referred to a Select Committee of the House of Lords. Mr. Hayes, Mr. Allen, and he (the President) attended before that Committee as witnesses. On the first day five opposing witnesses were heard against the Bill—namely, four from Belfast and one from Dublin. He did not think their evidence made much impression upon the Committee, or showed that there was very much ground for their complaints. At the same time they afforded the deputation from the Council an opportunity of accepting a couple of suggestions that they made, which showed that the former were disposed to give way on any reasonable point, and so far impressed the Committee in their favour. After the case for the Council had been opened they succeeded in establishing the justice of what they were seeking for. The members of the Committee listened very carefully, and appeared to take a great interest in everything that was laid before them. Lord Limerick, who represented the Government, closely watched everything, and made suggestions. Lord Meath, who, apparently, knew nothing beforehand about the subject, also interested himself very much in it, and, at the close of the evidence, showed, by some pointed questions, that he had thoroughly grasped the whole case. After hearing all the evidence, the Committee sat for two days. During that time the members of the deputation remained in attendance on them, and were frequently called in for the purpose of consultation. None of the changes that were made in the Bill were made without considering the Council's side of the question. The Bill as now printed went, in some respects, farther than anything that the Council had ever expected to get. A good many of the changes, however, were mere matters of form. For instance, the 5th and 6th clauses had been changed in form and also shortened by means of schedules annexed to the Bill. The principal addition to clause 6 was a provision giving to persons who were apprentices or assistants from 1875 to 1881, the privilege of registration upon their passing an examination; but there was a restriction to the effect that they must have been apprentices or assistants for four years in the employment of men who shall have been themselves registered. Clause 5 had been altered by the reduction of the fee payable by a man who was in business in 1875 from two guineas to one guinea.

Mr. Grindley: I thought the fee under section 6, including that for examination, was three guineas in the draft Bill.

The President: No, two guineas, and 10*s.* 6*d.* for registration.

Mr. Allen supposed that there should be both Arts and Chemical examiners.

The President, in continuation, said a cry made by their opponents was that they were going to be taxed without getting anything for their fee, and some members of the Committee immediately got hold of the cry of "no taxation without representation." The deputation thereupon agreed to import into the Bill a section on the same lines as the 18th of the original Act, authorizing persons who should be registered as druggists to become associate members of the Society on paying the same fee as members, and giving them a voice at the annual meeting and in the election of members of the Council. They asked to be allowed a representation on the Council; but that the deputation refused point blank to concede, contending that it would be absurd that men, some of whom had passed no examination at all, and others only a very minor examination, should be allowed a voice in the higher education of pharmacists. In that view the deputation were borne out by the Committee. The opposing witness who was first examined said he thought those for whom he spoke should have a fourth of the representation, while the next man asked for "half" of it. Clause 9 had to be altered sequentially in order to relieve associates from the 10*s.* 6*d.* fee. Clause 12 in the original Bill was one which they saw from the start that the Committee did not like. It provided that it should be "unlawful for any registered druggist to keep open shop for the retailing, dispensing, or compounding of medical prescriptions, or to allow any part of his premises to be used for such purpose." They said that the first part of that clause was superfluous, because it declared to be illegal that which was already illegal by law under both the Apothecaries' Act and the Act of 1875. A witness had been examined on the point, and the question was asked, was the clause intended to hit the case of that particular gentleman, which it

certainly was not. He (the President) offered an alternative clause to the effect that it should be unlawful for any registered druggist to let off any part of his shop or premises to be used for the purpose of retailing, dispensing, or compounding medical prescriptions, unless such portion of his shop was provided with a distinct supply of drugs, chemicals, and books of account, and was managed in all respects as a separate establishment. However, the Committee did not yet like it, and eventually, on the motion of Lord Meath, the following substitute clause, which really went much further than the original one, was inserted as clause 13 of the Bill, viz., every person practising as a registered druggist under this Act shall display conspicuously outside his place of business a notice in legible characters as follows:—"Not licensed to dispense or compound medical prescriptions; and, in default, shall be liable to a penalty not exceeding £1 for every day during which such default shall continue." The remaining alterations were of a merely verbal character.

Mr. Grindley: I notice that we are only given the declaration of one medical man or magistrate with respect to an applicant for registration.

The President: I fought as hard as I could for two, but the Committee appeared to think that one was sufficient.

Mr. Grindley: There are cases where we would be very glad to have more information than could be supplied by one person.

The President said the words in the original clause relating to the preliminaries for registration, "on such additional evidence as they should think fit," had been also struck out; but he was glad of that, and when consulted had expressed himself so, because those words would have left an opening for numerous applications for exceptional treatment in different cases. It was better to have a hard and fast line as to what evidence they were to accept or refuse.

Mr. Grindley: We can prosecute any man who makes a false declaration.

The President said the schedule which the applicant would have to fill up would be a statutory declaration, and if it were false the maker would be liable to very heavy penalties. He would be guilty of a misdemeanour under the old Act (sec. 28).

The Vice-President: My opinion is that if you have not been able to get exactly what you wanted, you have certainly got things that you never anticipated that you would obtain, and I think we are all agreed that our very best thanks are due to our President for the tact, energy, perseverance, and enthusiastic patience with which he has gone through this matter. I am not going, however, to make any formal motion to that effect yet, unless others are of opinion that it should be done.

Sir George Owens: I would put it formally.

The President: Wait, please, until the work is done. We are not out of the wood yet. And do not suppose that the work was all done by me. The assistance rendered by Mr. Allen and Mr. Hayes before the Committee was invaluable.

The Vice-President: I have not lost sight of that at all. If I had been making a formal motion on the subject, I would have said so, but I am now merely expressing my own feeling on the matter.

Mr. Grindley: It is the sense of all the Council.

Mr. Hayes remarked that the members of the Committee appeared to place the greatest confidence in everything that Mr. Brunker said. He was called in by them to consult on every step before they adopted it.

The President said section 13 of the Bill as it stood was Lord Meath's suggestion. He (the President) would complete his report by adding that on Saturday last he had a consultation with Mr. Clay, who told him that Mr. Close would endeavour to ascertain what steps the Government would take with regard to the Bill in the House of Commons. From the interest Mr. Balfour had already evinced in the subject, he (the President) had great hopes that he would see the Bill through this session. He had received a letter from Messrs Clay and Close relative to arrangements for the introduction of the Bill in the House of Commons. Nothing could exceed the pains which Lord Milltown had taken in connection with the Bill, and the great insight he had gained into the merits of the case.

A report from the Certificates Committee was laid on the table.

The President said the Council had been accused of not getting a sufficient number of persons into the profession. An answer to that was supplied by the facts that on the previous Monday, twenty-one young men presented themselves at the Preliminary examination, and that twelve were in for the license on that day (Wednesday), most of whom had passed Preliminary examinations other than the Society's.

On the motion of the President, seconded by Mr. Grindley, Mr. Edward McCreery Shea Hill, of 5, Donne Place, South Circular Road, Dublin, was admitted a member of the Society.

The Council then adjourned.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At a meeting of the Chemical Society, held on Thursday, June 21, Mr. W. Crookes, F.R.S., President, in the chair, the following were elected Fellows of the Society:—Messrs. J. Alexander, C. Bradshaw, L. Edmunds, W. H. Gibson, J. H. Maiden, H. A. Miers, F. Mousley, J. H. R. Paterson, G. W. Procter, H. W. Seely.

The following papers were then read:—

Chlorofumaric and Chloromaleic Acids and their Magnetic Rotatory Powers. By W. H. Perkin, Ph.D., F.R.S.

Combustion by means of Chromic Anhydride. By C. F. Cross and E. J. Bevan.—Ladenburg in 1865 described a method of ultimate analysis of carbon compounds, consisting in heating with iodic acid and sulphuric acid in sealed tubes; the oxidation was found complete for a satisfactory variety of substances, and the experimental numbers obtained showed the process to be available as a laboratory method of estimating carbon and hydrogen. The authors have investigated the action of chromic anhydride in presence of sulphuric acid on carbon compounds. Ladenburg mentions this "combustion mixture," but regards it as unavailable for quantitative determinations on account of the CrO_3 decomposing with evolution of oxygen. This, however, is shown by the author's experiments to take place to so small an extent under the conditions as to time and temperature of a combustion that it may be neglected. The action of the mixture has been investigated under atmospheric pressure in vessels connected with a gas collecting and measuring apparatus. The carbon of the celluloses and carbohydrates is entirely converted into gaseous products. Some typical benzenoid compounds have also been investigated, and the results indicate that complete oxidation may be effected. The monobasic acids of the fatty series on the other hand are not completely resolved, and the results are consequently variable. Amide and imide nitrogen prevent complete oxidation; one of the causes probably being that urea is not attacked by the mixture. Compounds containing negative radicles such as Cl, Br, S and NO_2 have not been investigated.

Mr. A. H. Allen said that he had been in the habit for years of using chromic anhydride for oxidising car-

bon in steel, but he had found that some carbon dioxide was always evolved when pure sulphuric acid and the commercial anhydride were used; he therefore prepared the solution of the anhydride from fused lead chromate and sulphuric acid.

Metaxylenesulphonic Acids. By G. T. Moody, D.Sc.

The Formation of Isomeric Toluenesulphonic Acids. By Hugh Gordon, B.A.

A New Method for the Preparation of Mixed Tertiary Phosphines. By Norman Collie, Ph.D.

Some Interactions of the Halogen Hydrides. By G. H. Bailey and G. J. Fowler.—The authors have found that when phosphorus pentoxide is exposed to hydrogen chloride gas at ordinary temperatures, large quantities of the gas are taken up by it, amounting to nearly ¼ of a litre per gram of the pentoxide, the gas and the pentoxide interacting chemically:

$$2P_2O_5 + 3HCl = POCl_3 + 3HPO_3.$$

A similar interaction occurs with hydrogen bromide, but none with hydrogen iodide. They have also observed that though hydrogen chloride has no action on mercury, yet if mixed with oxygen it readily attacks the mercury, forming an oxychloride, $Hg_2OCl_2 \cdot HgO$, action taking place even in the dark. With hydrogen bromide gas and oxygen the interaction is more rapid, but whereas in the case of the chloride the whole of the hydrogen is oxidized to water, in the case of the bromide a large proportion remains uncombined. Hydrogen iodide gas forms with mercury mercurous iodide or mercuric iodide, according as the mercury or the iodide is in excess.

Remarks on the Paper of Drs. Japp and Klingemann on the Constitution of certain so-called Mixed Azo-compounds.—By Professor Victor Meyer.

The Action of Potassium on Tetralkylammonium Iodides. By C. M. Thompson and J. T. Cundall.—According to Weyl, if potassium in solution in liquid ammonia act on ammonium chloride, ammonium is produced and dissolves in the ammonia, forming a blue solution; this statement lacks confirmation, and has even been contradicted. In the hope of obtaining more decisive results the authors have substituted tetramethyl- and phenyltrimethyl-ammonium iodide for ammonium chloride, but unsuccessfully. The greater part of the former was unchanged, a portion only being acted on by the potassium giving potassium iodide, ethane and trimethylamine; from the latter, potassium iodide, dimethylaniline and trimethylamine were obtained.

The Solubility of Isomeric Organic Compounds in Relation to their Fusibility. By Thomas Carnelley, D.Sc., and Andrew Thomson, D.Sc., M.A., University College, Dundee.—Seven years ago (*Phil. Mag.*, [5], xiii., 180) one of the authors showed that the fusibility and solubility of isomeric compounds were very closely related to one another, so that of two or more isomeric bodies, that dissolves the most easily which has the lowest melting point and in which the atomic arrangement is the least symmetrical. At that time the investigation had included only a comparatively small number (fifty-eight) of compounds. The authors have now extended the investigation, so as to include all isomeric sets of carbon compounds whatever. Their data have been obtained partly from literature and partly as the results of their own determinations. The following are their general conclusions:—(1) For any series of isomeric carbon compounds the order of solubility is the same as the order of fusibility, *i.e.*, the most fusible compound is also the most soluble. This rule has been applied in 1778 cases, of which 1755 accord with the rule, including all kinds of isomers, from the most simple to the most complicated. There are only twenty-three exceptions, and a large proportion of these is of a very doubtful character. (2) The order of solubility of the corresponding salts of any series of isomeric organic acids is the same as that of the acids themselves, *i.e.*, the salts of the more soluble and more fusible acids are also more easily soluble than the corresponding salts of the less soluble and less fusible acids; and if fusible more easily fusible, but the melting points of most organic salts cannot be determined, because they decompose before fusion. To this rule there are five exceptions out of 143 cases in which the rule can be applied, and as regards at least three of these it is very doubtful whether they are real exceptions. (3) The order of solubility of two or more isomeric compounds is independent of the nature of the solvent. This rule can be applied in no less than 666 cases, and among these there is not a single exception. The truth of the rule has also been proved more particularly in the case of meta- and para-nitraniline, the solubility of each of which in thirteen different solvents has been carefully determined. (4) The ratio of the solubility of two isomers in any solvent is constant, and is independent of the nature of the solvent; this has been proved as yet only in the case of the meta- and para-nitranilines in respect of thirteen different and very varied solvents. The extremely close and intimate relation of solubility to fusibility, however, is proved not only by the very large number of cases of isomeric compounds which the authors have examined (nearly 2000), but also by the relative fusibility and solubility of the various allotropic modifications of the same element (*e.g.*, P, S (?) Se), and of mixtures of organic compounds (*e.g.*, solid paraffins), and of inorganic salts (*e.g.*, sodium and potassium nitrates), in all of which it is pointed out that the order of solubility is the same as the order of fusibility, and that this order is independent of the nature of the solvent. The curve of the solubility of mixtures of sodium and potassium nitrates in various proportions is very striking. Starting with pure sodium nitrate, the solubility increases and the curve rapidly falls as the percentage of $NaNO_3$ diminishes and that of KNO_3 increases, until the proportion of the latter amounts to about 20 per cent.; the solubility then remains constant and the curve becomes a horizontal line until the proportion of the potassium salt reaches about 40 per cent., after which the solubility diminishes and the curve rapidly rises until pure KNO_3 is reached. The curve of fusibility falls rapidly from pure $NaNO_3$ until the latter amounts to 50 per cent., after which it remains constant until the KNO_3 equals 60 per cent., and then rises rapidly until pure KNO_3 is reached.

Notes on some Compounds of Chromium. By Sydney Lupton, M.A.—The determination of the atomic weight of chromium has occupied the attention of many chemists, but from a variety of causes the results obtained are far from satisfactory. In some cases single experiments are relied on, and in others proper attention has not been paid to the solubility of silver chloride in solutions of chromic chloride, the great difficulty of drying chromic sulphate without decomposition and of completely decomposing it by heat, the liability of barium chromate to carry down other salts, or to be carried down by barium sulphate. Hence the true atomic weight cannot be considered to be determined to within about 1 per cent. In fact Clarke, placing apparently great reliance on a single experiment of Siewert's takes Cr = 52·01; while Meyer and Seubert, giving greater weight to the experiments of Berlin, assume Cr = 52·45, which is practically the value preferred by Fresenius. The following experiments were made with the object of suggesting a method for the determination of the atomic weight of chromium free from the defects inherent in all the methods which have hitherto been used. Incidentally a few old results have been either confirmed or rendered doubtful. *Potassium Dichromate.*—The density of this salt was found by Thomson to be 1·98, which is copied into such authorities as *Wurtz's Dic-*

tionnaire and *Biedermann's Chemiker Kalendar*, 1884. Karsten found 2·6; *Miller's Elements* gives 2·62; Schröder found about 2·7. The density of some small crystals of the twice recrystallized salt was determined in benzene, the air being removed by a small hand-pump; it was found to be (i.) 2·69, (ii.) 2·67. *Ammonium Dichromate.*—The density is given by Clarke as 2·151. Three experiments in benzene, the air being removed by a small pump, gave (i.) 2·16, (ii.) 2·18, (iii.) 2·75, and one in chloroform (iv.), 2·18. One hundred grams of water dissolve—

At 7·0° about 23 gms. of the salt; at 60° about 82 gms.
„ 10·0 „ 24 „ „ 94 „ 115 „
„ 16·5 „ 28 „ „ 107 „ 173 „
„ 18·0 „ 33 „ „

The solution boils at 107° C.; its density is 1·12 at 10°, and 1·158 at 18° C. The finely powdered salt is easily dried at 110° in the air-bath. Darby states (*Journ. Chem. Soc.*, i., 20) that ammonium dichromate decomposes suddenly when heated to 200°. A small quantity of the dry powdered salt was heated in a thin test-tube, with a thermometer inside placed in a paraffin bath. Sudden decomposition took place at (i.), 228° C.; (ii.), 230° C. Since the composition of the salt has been placed beyond doubt by Siewert (*Jahresb.*, 1862, 148), the ignition of ammonium dichromate and the determination of the chromic oxide left seems in theory to afford an unexceptionable method of determining the atomic weight; but the difficulty of avoiding loss of oxide by the sudden rush of the gas is very great. Darby used tubes plugged with cotton-wool, Richmond and Abel tubes plugged with asbestos, and I have tried mixing the salt with a large excess of ignited silica without success. Hence it seemed advisable to reduce the salt previous to ignition to obtain the oxide. The reduction with hydrogen dioxide is rather tedious, and it is somewhat difficult to obtain a solution of the dioxide which leaves no residue on ignition. A solution of sulphur dioxide was therefore used as the reducing agent. 0·1539 gram of ammonium dichromate was dissolved, reduced by sulphur dioxide, evaporated, and the residue heated for two hours at 200°, when the residue weighed 0·3228 gram, which was reduced to 0·3218 gram by further heating during an hour and a half; this residue nearly corresponds to the formula $Cr_2 3SO_4 7H_2O$. After long-continued heating over a good argand, the residue consisted of a mixture of sulphate and oxide, which, when heated over a bunsen to bright redness for two and a half hours, gave a residue weighing 0·1021 gram, which remained unchanged after heating for another hour. Hence one part of ammonium dichromate left 0·6634 part of residue, the formula of which would be about $Cr_2 3SO_4 15Cr_2O_3$, instead of 0·60 required for Cr_2O_3. A second experiment gave similar results, and even prolonged ignition over a gas blowpipe failed to produce the mass to oxide. This difficulty in drying chromic sulphate, and in decomposing it by heat, explains the high value Cr = 53·563 obtained by Moberg by the ignition of chromic sulphate and of ammonio-chromic alum. Reduction with (i.) hydrogen oxalate, (ii.) alcohol and hydrogen nitrate, (iii.) alcohol and hydrogen chloride is liable to occasion loss by spitting. *Mercurous Chromates.*—These salts have been investigated by Vauquelin, Godon, Gmelin, Darby and Treese, but the results obtained are not very concordant. On pouring potassium dichromate into mercurous nitrate slightly acidulated with nitric acid, a heavy orange-red precipitate falls. Gmelin states that on heating this salt, Godon obtained 0·126 part, and he himself 0·1232 part of oxide. One part of $Hg_2O \cdot 4Hg_2CrO_4$ when heated would leave about 0·1232 part of oxide. According to Darby, the precipitate is of the composition $H\ O \cdot 3Hg_2CrO_4$, but he does not state that he himself analysed it. It is slightly soluble in water, and easily soluble in hot dilute nitric acid, from which it separates on cooling as the normal salt Hg_2CrO_4. From 1 part of this salt Darby obtained by ignition (i.) 0·1463, (ii.) 0·1488, (iii.) 0·1479 part of chromic acid. Wurtz, 'Dict.,' i., 896, assigns to Godon and Gmelin's salt the formula $Hg_2OHg_2CrO_4$, and Treese (*Zeit. f. Chemie*, [2], vi., 30) states that the salt thus obtained is normal and not decomposed by water. 1·7234 gram of mercurous chromate, obtained from Messrs. Hopkin and Williams, was heated over a bunsen burner until a dull green residue weighing 0·1943 gram was left. The ratio is 1:0·1127, and a second experiment, in which a slight loss occurred, gave 1:0·1118. This corresponds fairly to the salt $Hg_2O \cdot 3Hg_2CrO_4$ containing a little impurity or traces of mercurous oxide. A hot solution of potassium dichromate was poured into a hot solution of mercurous nitrate slightly acidulated with hydrogen nitrate. The fine heavy orange precipitate was washed, dried on the water-bath, and heated at 120° C., until it ceased to lose weight. Four experiments on the ignition of this salt gave the ratios:—

(i.) 1:0·1523 (iii.) 1:0·1516
(ii.) 1:0·1517 (iv.) 1:0·1510.

This powder then appears to be normal mercurous chromate containing a small proportion of either mercuric chromate or mercurous dichromate. A quantity of it was boiled for some time with dilute nitric acid and the undissolved residue was washed and dried. 1·5525 gram left on ignition 0·2294 gram of oxide, corresponding to the ratio 1:0·1477. Hence the undissolved residue seems to be normal mercurous chromate, Hg_2CrO_4. In conclusion, two methods for the determination of the atomic weight of chromium seem to suggest themselves:—1st. The reduction of ammonium dichromate at a low temperature by a weak solution of hydrogen oxalate, or of some similar reducing agent, and the determination of the chromic oxide left on ignition. 2nd. The ignition of normal mercurous chromate and determination of the chromic oxide. In the first case the required atomic weights are well known, but the purification of the dichromate is tedious, and the reducing agent causes additional chance of error. In the second case the chromate is more easily purified, but the results will be affected by the uncertainty still attaching to the atomic weight of mercury.

The Estimation of Alumina and Free Sulphuric Acid in Alum Cake and Sulphate of Alumina. By ROWLAND WILLIAMS. — The author recommends Chancel's method of estimating alumina by boiling with sodium thiosulphate (Watts' 'Dictionary,' i., 155) as more accurate and expeditious than the ammonia process. In support he quotes results obtained. The estimation of the free acid in alum cake, etc., is best effected by the following process:—300 grains of the sample are weighed into a stoppered bottle, and 1200 grains measure of strong alcohol added, the contents of the bottle being frequently shaken, and the digestion allowed to proceed all night. The next morning the alcohol is filtered off, and 800 grains measure of the filtrate (equal to 200 grains of the sample) titrated with decinormal caustic soda. Experiment shows that the alcohol does not extract other matters besides sulphuric acid which are liable to affect the result. To further test the accuracy of the method, ordinary sulphate of alumina was freed from sulphuric acid by washing with alcohol, and known amounts of acid were then added, and the amount estimated by the process described; the results were as follows:—

Percentages of Free Sulphuric Acid.

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
Added . .	0·73	1·22	0·98	0·49	0·59
Found , ,	0·69	1·19	0·96	0·44	0·54

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, June 28, Mr. G. Whitfield in the chair. A letter having been read from the President, Professor Attfield, F.R.S., regretting that he was too unwell to be present, the Secretary read the annual report of the Executive Committee as follows:—

ANNUAL REPORT.

The Executive Committee of the School of Pharmacy Students' Association have held three meetings for the transaction of the business of the session.

At a meeting held November 14, 1887, the Secretary reported that nomination papers had been printed at the commencement of the session, and forwarded to all members who had previously paid their annual subscriptions.

At the same meeting, the following gentlemen were appointed as a Committee of Reporters on the Sciences allied to Pharmacy:—Pharmacology, Mr. W. L. Williams; Practical Pharmacy, Mr. F. C. J. Bird; Botany and Materia Medica, Mr. E. White; Physics, Mr. F. W. Short; Organic Chemistry, Miss M. E. Buchanan; Inorganic Chemistry, Mr. L. W. Hawkins; Analytical Chemistry, Mr. W. Poole.

At a meeting held April 5, 1888, a grant of three shillings and sixpence from the Research Fund was made to Mr. Chaston to defray the expenses of a paper on Commercial Carbonate of Ammonium. A letter was received from Mr. Poole resigning his Reportership, and one from the Pharmaceutical Society thanking the Association for the volume of papers of the previous session which had been presented to the Library.

At a meeting held June 28, the following statement of the Committee of Reporters was read by the Secretary on behalf of the Committee.

The Committee of Reporters on Science have since their appointment in November, 1887, held two meetings for the transaction of business. At a meeting held November 24, 1887, the order of reports for the ensuing session was arranged; the following reports have been made by the members of the Committee during the session:—"Two Reports on Pharmacology," by Mr. W. L. Williams; "Report on Practical Pharmacy," by Mr. F. C. J. Bird; "Two Reports on Botany and Materia Medica," by Mr. E. White; "Report on Physics," by Mr. F. W. Short; "Two Reports on Organic Chemistry," by Miss M. E. Buchanan; "Two Reports on Inorganic Chemistry," by Mr. L. W. Hawkins.

This statement was approved by the Committee.

The following statistics show the progress of the Association during the session:—The number of members on the books is 70, being one less than last session; fifteen meetings have been held, including to-night's annual meeting, and the gross attendance has been 307, making an average of between 20 and 21 at each meeting; this shows a considerable increase on previous sessions:—The number of communications read has been 27, viz., 10 reports already mentioned, and 17 papers. The following is a list of the papers:—"Introductory Address," by Mr. G. F. Schacht; "The Estimation of Arsenic by Iodine," by Mr. E. J. Woolley; "Further note on the Estimation of Conium Alkaloids," by Mr. R. A. Cripps; "Micro-Fungi," by Mr. W. Wyatt; "A Resin from Central Africa," by Mr. L. W. Hawkins; "The Salt Industry in Cheshire," by Miss L. E. Boole; "The Fruit in Relation to the Dispersion of the Seed," by Mr. E. Perodeau; "Commercial Carbonate of Ammonium," by Mr. A. E. Chaston; "Climbing Plants," by Mr. W. A. Salter; "Ghatti and other Indian Substitutes for Gum Arabic," by Mr. A. Mander; "Carnivorous Plants," by Mr. R. T. Jennings; "The Action of Light on Iron Salts," by Mr. F. Browne; "The Use of Distilled Water in Dispensing," by Mr. P. A. Allez; "The Introduction and Rise of Coal Gas Manufacture," by Mr. H. B. Davis; "The Blood," by Mr. L. Ough; "How a Photograph is made," by Mr. G. Whitfield; "The Fertilization of Plants," by Mr. E. W. Lucas.

Nine of these papers and seven reports have been published by the Editor of the Pharmaceutical Journal, as well as abstracts of all the others. The Treasurer's accounts to be presently audited, show that the receipts have been £9 10*s.* 9*d.*, and the expenditure £8 7*s.* 6½*d.*, leaving a balance of £1 3*s.* 2½*d.* to be added to the Research Fund, which now amounts to £22 0*s.* 6*d.*

Messrs. E. W. Lucas and C. H. Loxley were appointed as auditors, to audit the Treasurer's accounts, which they reported to be correct.

The Chairman then moved the adoption of the report, which was seconded by Mr. Loxley, and carried unanimously.

The meeting then adjourned.

Provincial Transactions.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The above Society held its first picnic on Thursday afternoon, July 5, when about fifty ladies and gentlemen journeyed by train to Bleasby Station, and thence by road to Hazelford Ferry, a picturesque place on the banks of the river Trent, where, after indulging in cricket, fishing and other games, the party sat down to a substantial meat tea provided at the "Star and Garter" hotel. After tea, the President, Mr. Councillor Fitz-Hugh, J.P., congratulated those present and the Society upon such a successful gathering, and thought their best thanks were due to the Secretary and members of the Picnic Committee for their efforts in promoting the same.

The remainder of the evening was spent in music and singing, and the party returned home about 10 o'clock, after spending a very pleasant and social outing. A general feeling was expressed by those present that the picnic should become an annual affair, which no doubt will be carried out by the Society.

Parliamentary and Law Proceedings.

PHARMACY ACTS AMENDMENT BILL.

In the House of Commons, at the conclusion of the sitting on Tuesday, Dr. Tanner said he wished to ask some responsible Minister of Her Majesty's Government whether it was really intended to go on with this Bill. It was a very important Bill, and he wanted to know whether there was any chance of its passing. He hoped the Government would give attention to this matter.

The honourable gentleman was then called to order by the Speaker.

The second reading of the Bill was deferred until Monday next.

PROSECUTIONS UNDER THE PHARMACY ACT.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* WRIGHT.

On Monday, in Hamilton Sheriff Court, before Sheriff Birnie, Robert Alexander Wright, residing at No. 11, Townhead Street, Hamilton, was tried under a complaint at the instance of Richard Bremridge, Registrar under the Pharmacy Acts, 1852 and 1868, with the consent of the Procurator Fiscal of the Middle Ward of Lanarkshire. The offence was laid under sections 1st and 15th of the Act of 1868, and five specific charges were libelled.

Mr. Shaw, advocate, Edinburgh, instructed by Mr. P. Morison, S.S.C., Edinburgh, and Mr. R. Archibald, writer, Hamilton, prosecuted. The defence was conducted by Mr. Hay.

The Sheriff-Clerk read the complaint.

Mr. Hay: There are only two small items I wish to point out. On page 2 of the copy indictment served on me, there is this passage occurring, where they describe the locus at 38, Cadzow Street, viz.:—"Or by some other person or persons whose name or names are unknown to the prosecutor." I object to that. My second objection is that it is stated in the first charge that I sold a "quantity of oxalic acid," and in the second and third a "quantity of laudanum." It might be very large, or it might be infinitesimal. Now, the quantity will have a considerable bearing on the case, and I think it right it should be put in. Of course there is a power of alteration.

Mr. Shaw: With regard to the first point I object to any amendment. Your lordship will find, as the case proceeds, that the reason is that a company's name is put over the door, and the question who the real occupant is will arise. With regard to the second point, I do not quite follow my friend, but it appears to me that if I put in here that he sold laudanum that is enough. The section of the Act is that he shall not sell any poison. I have said he did sell poison. It would not have mattered as regards the charge whether it was a ton, an ounce, or a gram of poison.

The Sheriff: The three first charges are all for selling poison?

Mr. Hay: Yes, my lord.

The Sheriff: Can you give me any reason for your objections?

Mr. Hay: My reason is, in order to have a conviction it is necessary that the accused shall be the man in possession of the premises. That being the case, if he is in the employ of some other person it is the person who employs him, and not he, who is liable.

The Sheriff: That is a different case altogether. Suppose he sold on the street?

Mr. Hay: I should say that that would be different.

The Sheriff: Suppose he sold in this shop, although the shop belonged to another?

Mr. Hay: Then I am the agent, and there is no room for a conviction if there be there a duly registered person.

The Sheriff: Is it entirely under the 15th section?

Mr. Hay: The 1st and 15th. What I say is that from the context selling is one and the same thing as keeping open shop or retailing.

Mr. Shaw: They are disjoined. The point put by your lordship would illustrate that better than anything I can fancy. That is to say, he might have sold on the street. He might have sold a poison on the street to the evident and manifest danger of the public, and yet, on my friend's view of the statute, I could not get hold of him because he was not doing a thing equivalent to keeping an open shop.

Mr. Hay: Oh, no; I do not contend that at all.

Mr. Shaw: The charge, I may say, is limited wholly to selling in this instance.

The Sheriff: I do not think the objections are good. They must be repelled.

A plea of not guilty was then tendered.

Mr. Shaw: This is the stage at which I think it is most convenient that my friend and the Court should know the line I propose to adopt with regard to the various charges. The first, your lordship sees, is dated the 2nd of April, 1888. I tell your lordship at once that that is a case in which I hope to establish that the poison was sold in this person Wright's shop, but we have discovered that the actual seller was Cassels, against whom we have brought a separate complaint, and accordingly it would not be right, representing the prosecutor as I do, to attempt to force a double conviction on that. I think it, further, quite fair to the accused to say that the second and third charges, which of course I shall prove, seem to me in a sense to overlap the fourth charge, and I think, while I shall lead a certain amount of evidence, I shall not, at the conclusion of the case, address your lordship in support of the other charge—that of keeping open shop. Therefore, the complaint is reduced to the second, third, and fifth charges. I formally withdraw the first. I do not do so with regard to the fourth, but I intimate that that shall be the result we shall come to. I therefore begin practically with the second charge.

Evidence for the Complainer.

Richard Bremridge, the prosecutor, deposed: I reside at 17, Bloomsbury Square, London. I am the secretary and registrar of the Pharmaceutical Society of Great Britain, and under the 12th section of the Pharmacy Act of 1852, I was appointed prosecutor of offences under the statute, and I exercise the duties conferred upon me by that Act and the Act of 1868. I am aware of the case against the respondent here, Mr. Wright. He applied for registration as a chemist under the statute in August, 1885, making a declaration that he had been in business——

Mr. Hay: I object to any particulars as to what declaration was made. We are not here on a charge as to registration.

Mr. Shaw: That is perfectly true. Is Mr. Wright still on the Register?—No. His name was deleted from it in March last. The Council of the Pharmaceutical Society exercising its powers under the 12th section of the Act of 1868, ordered the erasure of his name from the Register at a meeting on the 7th March last. I was present when the matter was discussed, and I produce the minute book with the minute of that date, and also the written order of the Council. The minute of the Council is: "Moved by Mr. Allen, a member of Council, and seconded by Mr. Newsholme, and resolved—That the Registrar be instructed and is hereby authorized to remove from the Register the name of Robert Alexander Wright." Following upon that, I sent to the accused a letter, dated 8th March last, of which the following is a copy:—"I have to inform you that the correspondence and other papers respecting your registration as a chemist and druggist under the Pharmacy Act, 1868, were submitted to the Council at its meeting yesterday in conformity with the provisions set forth under section 12 of the statute. After full consideration, the Council has instructed and authorized me to remove your name from the Register of Chemists and Druggists. I have also to direct your attention to the fact that, as you are no longer registered as a chemist and druggist, you become liable to and will be proceeded against in regard to the penalties set forth in section 15 of the Pharmacy Act, 1868, if, after this notice, you continue to carry on the business of a chemist and druggist, or if you continue using any name implying that you are registered under that Act." I subsequently ascertained that he was carrying on business notwithstanding this letter, and by order of the Council the present proceedings were taken. On 3rd April I received a letter, dated 2nd April, from Mr. Hill, the Assistant-Secretary of the Society in Scotland, together with a package containing oxalic acid, bearing Wright's name, and labelled: "Oxalic Acid—Poison. Dispensing and Family Chemist."

Mr. Hay: I object to this. The label ought to be produced.

Mr. Shaw: What became of it?—It was destroyed.

Mr. Hay: I think I am in order in asking your lordship to refuse to admit the evidence?

The Sheriff repelled the objection.

Examination continued: The label was, "Robert A. Wright, Dispensing and Family Chemist, 38, Cadzow Street, Hamilton.—Oxalic Acid—Poison."

Cross-examined by Mr. Hay: Can you tell me if Mr. Robert Mackill, Junr., Mr. William Mackill and Mr.

William Hamilton, all of Hamilton, are on the Register of Chemists?—I cannot tell you that without notice.

You know as a matter of fact? You have consulted the Register with regard to——?

Mr. Shaw: Suppose they are? I should object to the question.

The Sheriff: Do I understand that Mr. Wright's name was put off the Register because this Council were dissatisfied with his qualification?

Mr. Hay: That is so.

Mr. Shaw: That is not so.

Witness: He was struck off the Register because he had obtained registration by fraud. To the satisfaction of the Council it was proved he had obtained his registration by fraud.

Mr. Hay: I think it is scarcely fair to the accused for that to be put. We are not here on a charge of fraud, and I demur to its going forth to the public that Mr. Wright's registration was procured by fraud. All we have to do with here is that on March 7 he was put off the Register. That I am prepared to admit, but I am not prepared to go into a question on which I have got no notice.

Mr. Shaw: I acted very gently by the accused when I contented myself with bringing out that the Council had exercised its powers under the second part of the section, and held it proved that the entry was fraudulently or incorrectly made.

Mr. Hay: That it was incorrectly made, but to fraudulently I demur.

Mr. Shaw: Mr. Hay has brought out what I did not bring out at all.

Mr. Hay: I did not. It was the Court.

Mr. Shaw: But it is now proved it was a fraudulent entry.

The Sheriff: I understand Mr. Wright's name was deleted under section 12 of the Act, and Mr. Hay's question is this, were certain other gentlemen's names on the Register? I assume you are to follow that up by showing that they are in the same position as Mr. Wright?

Mr. Hay: And to go a step further. I am to endeavour to prove that where there is a duly registered person, or a person who is a creative of statute, and he has a shop, it is the universal practice for that person to employ both registered and unregistered assistants, each and all of whom dispense poison. That is to say, where you have got a shop with a duly qualified head, it is not necessary that the man in that shop who has to dispense poisons should be registered.

The Sheriff: I quite follow. Do not you think you could get your answer without bringing in other names?

Mr. Hay: I think not. I purpose putting them in the witness box.

The Sheriff: You might do that, too, without asking Mr. Bremridge. He might have a natural disinclination to deal with other people.

Mr. Hay: Mr. Bremridge is the prosecutor, and he is bound to give me, I take it, any information which is in his power, unless he can show very strong reason for withholding that information. I have not the slightest doubt Mr. Bremridge knows thoroughly whether these gentlemen are on the Register on not. If he says he does not know, I can press it no further. There is an end of it so far as he is concerned.

Mr. Shaw: I still fail to see what is the relevancy of it. Mr. Hay is going to prove that there is a practice to the effect that if somebody has a right under the statute and employs somebody else who has no right to sell poison, that that person who has no qualification is entitled to escape on account of proved practice. I am going to submit that if there is such a proved practice the sooner we commence our prosecutions the better. The question is, what is the construction of section 15, and I submit that no amount of proof of practice will elucidate what the statute means.

The Sheriff: I think you will get your point otherwise.

Cross-examination continued: You know the first fifteen sections of the Act of 1868 do not apply to medical men qualified before the passing of that Act?—Yes.

Do you know that prior to 1868 medical men were in the habit of keeping a doctor's shop and dispensing poisons?—No doubt.

And they were also in the habit of employing as assistants non-registered persons?—I presume so.

Do you know that it is at the present day the practice for other medical men keeping a shop or registered chemists keeping a shop to employ non-registered assistants?—Yes.

That of course is necessary because they require to be a certain time as assistants before they can qualify for registration?—Yes.

Do you know that these assistants are in the habit of selling poisons?—I should imagine they would not do so unless under the supervision of a qualified man.

Do you know as matter of fact that they do sell small quantities of poisons?—I know it as common knowledge.

And no prosecution follows on the carrying out of that practice?—I cannot say that.

Do you prosecute where you find the unregistered assistant of a registered chemist selling, we shall say, a pennyworth or two pennyworth of laudanum?—Not yet.

And you have been Registrar for how long?—Four years.

And I suppose you know of hundreds—possibly thousands—of cases, in which these small quantities are sold by unregistered assistants?—I cannot say. I should think the common practice is for an unqualified person to dispense under the supervision of a qualified man. That is the theory.

Do you know as matter of fact that it is frequently done without any supervision at all?—No, I do not.

Now you say that Mr. Wright's name was deleted from this Register?—Yes.

Might I inquire who drew your attention to the desirability of erasing his name?—I would ask the Court to excuse my answering that question. We should never be able to take up any case at all if we disclosed the names of our informants.

Mr. Hay: Perhaps I should point out what my question points to. It is simply this: I believe, or at least I hope I shall be able to prove, before I am done, that this case, while nominally in the name of Mr. Bremridge, is in reality the work and at the instigation of a rival druggist in town.

The Sheriff: Suppose it is. What has that to do with the prosecution?

Mr. Hay: It simply comes to this: I believe I shall bring out facts that will justify your lordship in holding that if a conviction follows, it would be a perfect travesty of justice. I shall prove, or shall endeavour to prove, that this man, who is the prosecutor, is a man who offends day and date, if offence it be.

The Sheriff disallowed the question.

Mr. Hay: I ask this further question. Who informed you, after the deletion of the name, that the accused was selling poisons?—I instructed my assistant, Mr. Hill, to ascertain whether he was obeying the order or not.

Do you know how he got his information?—I really cannot tell you. I did not expect to have the decision of the Council reviewed.

Re-examined by Mr. Shaw: Following my instructions, Mr. Hill went to Hamilton, and spoke to the accused.

There are many prosecutions in the interest of the public?—Clearly.

And in a case where there was no personal super-

vision at the time of the sale of poison, it would be your duty, and according to your practice, to prosecute in the interest of the public?—I imagine it would be. I should be subject to the order of the Council. I simply carry out the order of the Council.

Are you aware of your own knowledge of any such practice as that suggested, where people without any qualification do in fact sell poisons?—No, I should imagine they do not, unless under the supervision of a qualified man. That is in accordance with my experience.

Mr. Hay: I think your lordship has it that he has never prosecuted before for the selling of one pennyworth or two pennyworth of laudanum.

The Sheriff: Yes.

Witness: I never said so.

Mr. Shaw: You have had frequent prosecutions for selling 1d. and 2d. worth?—Very many.

The Sheriff: The question was: suppose a qualified person in a shop with an unqualified assistant, and the unqualified assistant sold 1*d.* or 2*d.* worth of laudanum without showing it to the qualified person, have you prosecuted in such a case?—No, my lord. That was the answer that I gave.

Mr. Shaw: You never had a complaint of such a case?—No, I never remember such a case coming before me.

You have had, however, complaints of sales by an unqualified person who was a partner of a qualified person?—Yes.

And obtained a conviction?

Mr. Hay: I do not know if that is relevant.

And that was for selling 1*d.* worth of laudanum:—Yes.

Mr. Hay: I understand your lordship to rule that this was not relevant?

The Sheriff: I think I have taken it down in a form that it will not be objected to.

John Rutherford Hill, examined by Mr. Shaw, deposed: I am the Assistant-Secretary of the Pharmaceutical Society acting in Scotland. In the beginning of the year I had instructions from London to make inquiries in regard to a person of the name of Robert Alexander Wright. When I say from London, I mean from Mr. Bremridge, my superior. I was informed by Mr. Bremridge by letter on 9th March that the name was after certain proceedings erased from the Register, and he asked me to ascertain if Wright had ceased to carry on business as a chemist and druggist. In consequence of that letter, I visited Hamilton on 2nd April. I went straight to Wright's shop, and found him there. I asked him if he was Mr. Wright. He said yes. I then asked him if this business was his. He said no. He said it had been transferred. I did not at that stage tell him who I was; a little further on I did. I asked him who it had been transferred to. He said to the Hamilton Apothecaries' Company, and I asked him for the name of the shareholders. He said the sole shareholder was Dr. Lennox, Auchenarden, Hamilton. He told me the doctor was not at home, and would not be home for some time, and as I could not wait I did not see him. I asked the name of the proprietor of the shop, and he gave me the name of a lady, Mrs. Henderson, Auchingramont Road, and stated that she was out of town, and that I could not see her. I had told him by that time that I was the Society's Assistant Secretary for Scotland. I asked him if his name appeared anywhere in connection with this business. He said no. I drew his attention to several bottles on the counter having his name on them, and also the words, "Dispensing and Family Chemist." I asked him for an explanation, and he did not seem to be able to give any proper explanation. He showed me another label which he said he was now using, with the name "Hamilton Apothecaries' Company" on it. In consequence of what I saw and heard, I found it my duty to watch his operations. After leaving his place, I went to the shop of Mr. Mackill, who is a chemist and druggist in Cadzow Street, a few doors further along, and got him to send a boy for some oxalic acid. I did not see him dispatched. I had some other business which took me from Mr. Mackill's, and on returning he gave me the package of oxalic acid, which had been purchased by the boy. It was labelled "Robert A. Wright, Dispensing and Family Chemist—Oxalic Acid—Poison—38, Cadzow Street, Hamilton." I analysed the contents of the package and found it to contain oxalic acid, which is a dangerous poison. On the same night, I sent it by post to London along with a report, and afterwards received instructions to prosecute. Wright was the only person present, and it was an open shop. I left instructions with Mr. Mackill to send other messengers for purchases of poison, and on 8th May last I got, by post from him, a bottle containing laudanum. I produce the bottle with the label, "Received by post from Mr. R. C. Mackill, Hamilton. Analysed and found to contain opium, and to be laudanum.—J. Rutherford Hill." On the bottle there is the label, "Robert A. Wright, Family and Dispensing Chemist—Laudanum—Poison." On 14th of June, I got another bottle containing laudanum, which I now see labelled "Received from Peter Morison, S.S.C. Analysed and found to contain opium, and to be laudanum." The label on the bottle is the "Hamilton Apothecaries' Company, 38, Cadzow Street—Laudanum—Poison." It was handed to me by Mr. Morison, S.S.C., with whom, by this time, I had been in communication as agent for the Society in Scotland. Laudanum is a preparation of opium, a poison, as is also oxalic acid, within the meaning of the Act.

Cross-examined by Mr. Hay: Are you a duly qualified analyst?—I am a pharmaceutical chemist. I see that the label on one of the laudanum bottles is pasted over another label. I do not know what the lower one is.

Do you notice that the upper portion is clean and the lower is black and dirty?—I cannot say I notice much difference. The upper portion is cleaner than the lower portion. On the other bottle the name seems to have been cut off, and the slip with "Hamilton Apothecaries' Company" pasted on it.

Does it not look as if there had been a similar label on the first of these?—I should not think so. That is the condition in which I got it. I cannot speak as to the condition in which it was when originally got.

Do you know if it is the practice for registered chemists to have persons not registered?—Oh yes, quite common. I should think that would occur in every chemist's shop, with the view of their acquiring knowledge and practice sufficient to enable them to qualify.

Do you know it to be the practice that these unregistered assistants dispense small quantities of poison, such as a pennyworth or two pennyworth of laudanum?—Yes.

And I suppose that practice obtains universally or almost universally?—I cannot speak to that. I know it to be a very common practice.

And you would not think of reporting a case of that kind with the view to prosecution?—I report no cases except what are reported to me.

Would you consider that a bad case for a prosecution?—Well, that is a matter of opinion, on which I would not like to make any statement. It is not my duty to decide.

Re-examined by Mr. Shaw: In the cases of unqualified assistants dispensing poisons, to which I refer, I mean unregistered or unqualified assistants selling under personal supervision of qualified men. I mean by "supervision" the presence of a qualified chemist when the pennyworth or twopennyworth of poison it

being sold. I do not know of any cases of sale without the qualified man being there at the time of sale.

Peter Morison, S.S.C., Edinburgh, examined by Mr. Shaw, deposed: I am Secretary of the Trades' Protection Society, and agent for the Pharmaceutical Society. I received by post on June 14 from Hamilton a bottle containing laudanum with the name "Hamilton Apothecaries' Company" on it, and I handed it to Mr. Hill in the same state as I found it.

Robert C. Mackill, chemist and druggist, Cadzow Street, Hamilton, examined by Mr. Shaw, deposed: I remember in the beginning of April getting a call from Mr. Hill with reference to an alleged breach of the Pharmacy Act, and he communicated certain facts to me. On April 2, I called in Michael Rafferty, at Mr. Hill's request, and sent him to Wright's shop for a pennyworth of oxalic acid. He returned with the package and handed it to me, and I handed it to Mr. Hill in the same state as that in which I received it. The designation on the package was "Robert A. Wright, Dispensing Chemist and Druggist." On May 4, I sent William More to Wright's shop for a pennyworth of laudanum, and asked a man named James Cairns to accompany him. They came back shortly afterwards with the laudanum in a small bottle, and I packed it up in a box and dispatched it by post to Mr. Hill. On June 13, I sent James Cairns for a pennyworth of laudanum to Wright's shop. He brought it, and I sent it to Mr. Morison. It was in a bottle. I packed it and posted it in the same condition as that in which I received it.

As you did with all the others?—It was first handed to Mr. Archibald, and when I got it back I laid it on a shelf, but finding that the bottle was cracked and leaking I put the laudanum into another bottle and put on the old label. That was the 4th of June bottle.

The Sheriff: Why did you hand the bottle to Mr. Archibald?—I was told by Mr. Hill to do so.

Mr. Shaw: Mr. Archibald was the local agent for the Society? Yes. I got it back in a day or two afterwards. A little slip on it came off and left the plain label. I could not find the slip to put it on again. In April the sign above Wright's door was "Robert A. Wright," with "chemist" on the one side and "druggist" on the other.

I believe there was a change took place?—I saw the sign rubbed out, and I wondered at it, because it was not such a long time since it was put up. It remained rubbed out for a time, and then after it was put up, "The Hamilton Apothecary Hall." The shop door had two glass panels with "dispensing" on the one side and "chemist" on the other.

Cross-examined by Mr. Hay: Had you given information which led to Mr. Wright's name being taken off the Register of Chemists?—No. I knew nothing about it.

Did your sons do so?—They never did. I first heard of it on April 2, when Mr. Hill came through.

I think it was after that that the name was painted out?—No. The sign was rubbed out a short time before Mr. Hill came.

So you were wrong in saying it was after Mr. Hill was here the name was painted out?—Yes. I know Dr. Lennox. Until recently he had his dispensing room with me.

You knew, I think, at the beginning of the year that he intended leaving?—I never heard of it. I first heard four weeks before he left.

You never heard till then?—Never a syllable.

Dr. Lennox is a duly qualified and registered medical man, and entitled to keep open shop as a chemist?—I do not know that.

He was in partnership with you as a chemist in 1853 or so?—He never was.

There was not a co-partnery between you and him?—No. I have two shops in Hamilton—one in Cadzow Street and the other at the New Cross.

You have two sons, Robert Mackill, Junr., and William Mackill, who assist you, and a son-in-law, William Hamilton, also assists you occasionally; none of these are on the Register of Chemists?

Mr. Shaw objected to the question, and the Sheriff sustained the objection.

Witness: The law does not require them to be registered. My two sons assist me. I am in the New Cross shop three times a day.

For short intervals?

Mr. Shaw again objected.

Mr. Hay: Do these three gentlemen dispense poisons in your absence?

Mr. Shaw objected, and Mr. Hay pressed the question, while the Sheriff failed to see what it had to do with the interpretation of the statute libelled.

Mr. Hay: This is a case in which a most invidious distinction is being made against this poor man for the purpose of driving him out of Hamilton.

The Sheriff: I cannot imagine that the case will be proved by this class of evidence.

Mr. Hay: I say this old gentleman is the instigator of the whole of this.

Cross-examination continued: In writing to Mr. Hill I did not explain that the label on one of the laudanum bottles was not the same as when I got it from Wright. I knew the bottle was got for the purposes of a prosecution.

Then why did you fail to tell Mr. Hill such an important thing as that? Was it not that you wished to see a conviction against Wright?—I would scarcely say so.

Is that not the reason?—No.

What was your reason?—I had no ill-feeling at all against Mr. Wright. I knew at that time that Dr. Lennox was going to his premises. I had a feeling on that subject.

Does that not account for your sending the bottle to Mr. Hill with the label in the state you did?—No, it was a mistake.

Mr. Hay: I think I have shown that there is animus on witness's part, and I again ask him, are your sons and son-in-law on the Register?

Objection taken and sustained.

Mr. Hay: Do they dispense poisons in your absence?

Objection repeated and sustained.

Mr. Hay: Did your son, Robert Mackill, at one time carry on an independent business at Coatbridge?

Question objected. Objection sustained.

Mr. Hay: Is it the practice where there is a registered chemist for his unregistered assistant to dispense small quantities of poison?—Oh, yes.

Mr. Shaw (simultaneous with the answer being given): I object.

Mr. Hay: You are a little late.

The Sheriff: That is a point that I naturally would like to know about. You will not object to that?

Mr. Shaw: Oh, no.

Cross-examination continued.—That is common in the business of a registered chemist. Such a practice, I think, is universal in Glasgow, Hamilton and elsewhere?—I do not know.

Is it your practice?

Mr. Shaw: I object entirely to the question.

The Sheriff: I would not press these questions. They can have no effect on the result.

Mr. Hay: I must press the question.

The Sheriff (to witness): The question is this:—Is it your practice to allow your unregistered assistants to dispense small quantities of poison without any supervision over them?

Mr. Shaw: He does not understand the question.

Counsel objected to the question, and the objection was sustained.

Mr. Hay: I had a number of questions on this line

but I need not put them. Does Mr. Wright's name appear above the shop?—No.

And you know as matter of fact that the business belongs to Dr. Lennox?—Never heard.

Never heard it hinted?—I have heard it hinted, but never was told that it was so.

Are you certain you never was told?—Never that I could believe it for the truth.

It is current report, is it not?

The Sheriff: I suppose it will be proved that it is so.

Re-examined by Mr. Shaw: When I sent the phials to Mr. Morison and Mr. Hill I do not remember if I wrote a letter with them. (Shown parcel cover.)—I sent the one to Mr. Hill in that.

By the Court: The exact words on the oxalic acid package were "Robert A. Wright, Dispensing and Family Chemist, 38, Cadzow Street, Hamilton.—Oxalic Acid—Poison." It was given to Mr. Hill exactly as I received it.

Mr. Hill (re-called):—I received the package of which I am now shown the label. There was no letter with it at all.

Several witnesses were examined as to the purchase of the poisons, and the prosecutor closed his proof.

Evidence for the Respondent.

William Walter McTudoe, law clerk, Hamilton, examined by Mr. Hay, deponed: On the 4th of this month, Lewis Shearer, law clerk, purchased some laudanum at Mr. Mackill's druggist's shop, New Cross. I was along with him.

The Sheriff: Pardon me, what is this for?

Mr. Hay: To show the practice.

The Sheriff (to Mr. Shaw): Do you object?

Mr. Shaw: Certainly.

The Sheriff: Objection sustained.

Mr. Hay: Your lordship disallows that. Then I purpose putting in Mackill himself.

William Mackill, examined by Mr. Hay: I am a son of Mr. R. C. Mackill, chemist and druggist, Hamilton. I am not a registered chemist.

Do you assist your father in his shop at New Cross?

Question objected to, and after parties had been heard, in which Mr. Shaw, in reference to the repeated assertion by Mr. Hay that Mackill was the instigator of the prosecution, said he had no more to do with it than the man in the moon. Objection sustained.

Mr. Hay next tendered Robert Mackill, junr., and as the questions he proposed to put were similar to the above they were disallowed.

Thomas Brodie, partner of the firm of Brown Bros., Wholesale Chemists, Glasgow, spoke to having known respondent for a dozen years, and to his having been regularly trained as a chemist, and to his having managed a chemist's business before he came to Hamilton. His firm had supplied him with goods until his name was struck off the Register, when he informed witness that Dr. Lennox had taken over the business. Financially, Wright was owing him a little money, and he expected if he opened business again he would deal with him.

Is it the practice in Glasgow for registered chemists to have unregistered assistants who, in their absence, dispense small quantities of poison, such as 1*d.* and 2*d.* of laudanum?

Mr. Shaw: I object. That is the same question.

The Sheriff: There is no doubt it is the same question.

Mr. Hay: It is the essence of my case.

Mr. Shaw: Really, there is something due to the Court.

The Sheriff sustained the objection.

Mr. Hay: I will put another question. Would the effect of a finding that non-registered assistants could not dispense small quantities of poison be to close the half of the druggists' shops in Glasgow?—I should say, in fact, the half; indeed, I should say three-fourths.

Mr. Shaw: Your Lordship understands this question is also objected to?

The Sheriff: I have taken it down.

Mr. Hay: And this is what is called a fair prosecution?

Hugh Thomson, traveller for James Taylor, wholesale chemist and druggist, Glasgow, gave similar evidence.

Dr. Lennox, Hamilton, examined by Mr. Hay, deposed: I have been connected with the medical profession for sixty years.

And you were in practice, of course, very long before 1868?—1838 is the date of my first diploma.

Before 1868, was it the practice for doctors to keep a doctor's shop?—Yes; there was the ordinary doctor's shop most young men had when they started business.

A dispensing business?—Oh, everything connected with the sale of drugs, including poison.

Their assistants were unregistered?—Certainly. There was no registration in those days at all.

And you in common with others carried out the same practice?—Yes.

I believe, in addition to your medical studies, you had a course of training as a druggist?—I served a regular apprenticeship in a doctor's shop, where we had a large drug business.

And you consider you are entitled to keep a doctor's shop with unqualified assistants if you choose?—Of course I am. I can put my housemaid behind the counter if I choose, and nobody dare say nay.

When Mr. Wright some years ago started business as a chemist and druggist he was on the Register?—I suppose he was.

You undertook certain pecuniary obligations?—I knew Wright to be a very deserving man, and I was very glad to be of assistance to him; and I became security for an advance to the bank on his account.

At that time you had a consulting room with Mackill?—Yes.

And, to put it plainly, you and Mackill were not getting on very well?—Personally I could get on with anybody, but I foresaw I would be obliged to leave Mr. Mackill.

And you at that time thought that this would be a place you probably might require to go to at any time sooner or later?—Yes. In fact, I made the advance to the bank on condition that I was to take possession of Mr. Wright's place at any time I should think fit.

Now, in the beginning of March, did Mr. Wright come and inform you that his name had been deleted from the Register?—Yes. Prior to that I knew there was some correspondence going on. I perhaps did not know all the particulars, but I knew there was something, and it is a curious thing, I got it, not from Wright, but from second hand altogether, from parties I knew it might have come from.

Who were they?—I would rather not tell. I knew of the existence of the correspondence, and in the beginning of March Mr. Wright told me of the result; that he had been struck off the Register.

What did you then do or say?—What could I do? I had become security for Mr. Wright; I wanted a new consulting room; and I said, "There is nothing for it, I must take the whole thing over myself," and after March 1 I considered myself liable for the whole. I could not go on until May 28, as I felt in honour bound to send my prescriptions to Mr. Mackill, and keep his room up to that date.

You did take it over?—I am responsible for the whole thing. It is my business.

And Mr. Wright's name was at once painted out?—I had some delicacy in sticking up my own name, and we agreed to put up the Apothecaries' Company.

You have since removed there?—Yes. We have been there for six weeks, and are very much delighted with the change.

And Mr. Wright in his actings since March 1 has been your dispenser?—Yes.

And your reasons for making that change were that you had previously determined to make a change; and, secondly, you had advanced the money on condition that you were to take possession whenever you chose?—Yes.

If you had not done so, of course the shop would have required to have been shut up?—Oh, yes, and poor Wright would have been ruined. There can be no doubt about that. He would have been obliged to make a forced sale, and it would have ruined him. My own money was nothing. I told him to intimate the change of occupancy to the proprietrix of the shop, and I afterwards called upon her and confirmed it. I also returned it for the valuation roll in my own name.

Prior to 1868, you used the word "chemist" on your shop?—I not only had an independent shop of my own, I was in partnership with a chemist and druggist in 1853. I can produce the deed of co-partnery. I have it in my pocket.

Cross-examined by Mr. Shaw: When did you make the return, doctor, to the valuation roll?—I cannot tell you the date, but you may get it on applying to Mr. Allan, the assessor, I have no doubt. I cannot carry these dates.

When was the sign altered?—I cannot remember that. I do not know when Mr. Wright was struck off the Register, but the moment he was the sign was changed.

At all events, you did not go to the premises till the 28th?—I could not, but they were my premises nevertheless. I did not go till the 28th.

So that anything Wright did up to 28th May you were not superintending him?—It was not necessary.

That may be. Will you answer the question?—No, I was not superintending him. There is no doubt about that.

In fact, you left Wright up to the 28th of May as uncontrolled in the management of the business, so far as selling was concerned, as before?—Quite, except that I was responsible for anything that went on in the shop.

And if anything had gone wrong in the shop, and a prosecution had taken place, would you consider him responsible?—He was criminally responsible, and I was pecuniarily responsible.

Do you consider it a safe thing, doctor, to take your own instance, to allow a housemaid to dispense medicine without supervision?—If the housemaid is a clever woman I think she is quite safe. Women dispense very frequently.

You would consider it perfectly consistent with the safety of the public to allow her, although an unqualified person?—I do not say that. I said I was at liberty to put in my housemaid if I thought fit.

I know you said you were at liberty, but do you think you were safe?—I think if a woman was instructed she would be perfectly safe.

Instructed in medicine?—Yes, or drugs.

She would require, in fact, to be a skilled druggist?—Not at all.

A qualified druggist?—Yes.

Suppose she was not a qualified druggist?—Well, I would take the risk. I do not say I would, but I say I am entitled.

You say you are at liberty, and my question is, do you think it safe?—No, I do not think it would perhaps be safe.

I should hardly think so. Did you ever have a druggist's shop before?—I had a druggist's shop from 1842 for 30 years.

Since 1868?—Well, I cannot say, but I had a regular consulting room, where I dispensed drugs.

In fact, since this statute for the protection of the public was passed in 1868 until this case came on, you do not know whether you had a druggist's shop or not?—I know I had one for 30 years, but I cannot tell when it was given up.

Keep to the point.—I don't want to shirk the point.

Since this statute was passed in 1868, do you know whether you had ever a druggist's shop until the other day?—I really cannot say.

It comes to that: you cannot say?—Stop a moment, I must have had a druggist's shop for 35 years.

You started 60 years ago?—You don't suppose that I wished to tell anything untrue?

Not at all. But I wished to see if I could get out of you whether from 1868 onwards you ever kept a shop?—I cannot tell you. 1831 was the date of my beginning.

Re-examined by Mr. Hay: Have you found Mr. Wright a thoroughly qualified chemist and druggist and dispenser of medicine?—Without wishing to disparage anyone, I think he is equal to any gentleman in Hamilton. He is a thoroughly competent man. He is a man in whom I have perfect faith, both as a chemist and a most respectable man.

Formal evidence was given by Mrs. Henderson, proprietrix of the shop, and William Cassels, occasional assistant to Mr. Wright, after which respondent closed his proof.

Mr. Shaw, in addressing the Court, disclaimed any desire on the part of the Society to adopt any proceedings which could be characterized either as persecution or unfair, and denied that Mackill had anything to do with the prosecution; he had merely been loyal to the Society, which existed for the protection of the public. Speaking of the charges, as already explained, the first had reference to Cassels, the second and third to acts of sale, and the fifth to his assuming the title of chemist. He thought there could hardly be a doubt that the sale had been proved, and that Wright was a person not entitled to sell; indeed, this was admitted, but it was said that somebody else, who was entitled under the Act to have such a business, was owner of this and the respondent was left in control. He asked his lordship, as a matter of common sense, to consider how was the safety of the public one bit better protected if somebody else took over the financial responsibility? As regarded the public there was no change whatever. Wright was still carrying on, without any further supervision, the business of a druggist. Counsel contended that that point had been settled by the decision in the case of the London and Provincial Supply Association. It would be upsetting the whole law of the two countries if any other decision were come to than that the sale by Wright was a breach of the statute.

Mr. Hay, for the defence, attributed the prosecution to animus on Mackill's part from pecuniary considerations, and he refused to credit the Society with the leniency it claimed to have shown in the case. He complained he had not been allowed to prove practice. He had, however, shown, if his friend's reading of the statute as to assistants was correct, the effect would be to shut half the chemists' shops in Glasgow. Coming to the kernel of the defence, he said it would not be denied that the business was taken over by Dr. Lennox, who had substantial interest in it in the beginning of March, immediately after Wright's name was taken off the Register. The question then came to be, was Dr. Lennox, a registered practitioner before the passing of this Act, entitled to carry on business and put into it a dispenser who was not a registered man? He said most unhesitatingly he was; whatever might be law regarding chemists, medical men practising before 1868 were entitled to carry on such business by unregistered assistants prior to that time. This was the universal practice, and by the Amendment Act of 1869 it was enacted that the first fifteen sections of the 1868 Act

were not to apply to medical men of a certain class, of whom Dr. Lennox was one. The question brought itself back to, had Dr. Lennox done anything now he could not have done before the passing of that Act? That he could have done that previously was matter of notoriety, and the Act of 1869 put him in the same position so far as the selling of drugs was concerned as before. He submitted he was entitled to the acquittal.

The Sheriff: This complaint is divided into five branches, but it really amounts to three. The first is that the respondent, not being qualified, sold poison; the second that he kept open shop; and the third that he took the title of chemist. I do not think that I can convict on either of the two last. I think the respondent, with all reasonable haste, did make over this business to Dr. Lennox, and although he may have had a few bottles in the window, or may not have got his name rubbed out of the door next day, that does not seem to me to incur the penalties under the Act. It has been said Dr. Lennox, or the Hamilton Apothecaries Co., is not entitled to take the name of chemist either. All I need say as to that is that neither Dr. Lennox nor the Hamilton Apothecaries Co. is a respondent in this complaint. The real point is whether a qualified gentleman can employ an unqualified assistant, and that depends upon the Act of 1868. The 15th section may be taken—it is the same as the first, and it runs—"From and after the 31st day of December, any person who shall sell or keep an open shop and shall not be qualified, shall, for every such offence, be liable to a penalty." The respondent reads this: that it is sufficient if there is a qualified gentleman pecuniarily responsible. I cannot concur in that. I think the object of the Act is the protection of the public, and that the protection of the public would not be served by such a reading. My opinion is that the words "who shall sell" are disjoined from the words "who shall keep an open shop," and that there are two distinct offences. I therefore think that the respondent may be liable. I am not at all alarmed at the remarks of some of the witnesses, that if this reading is correct it will shut two-thirds of the chemists' shops. It will not shut a single shop in Hamilton or Glasgow. It simply means that there must be a qualified person for the protection of the public, having what has been called the supervision of a chemist's shop. That you may have numbers of unqualified persons is very probable, and that in practice you may have them occasionally acting on the general orders of their master, dispensing a small quantity of poisons in the absence of their master, is also probable; but I have not the slightest doubt of this, that, as laid down by Lord Selborne in the English case quoted, the protection of the public demands that every chemist's shop shall be under the immediate and reasonable supervision of a qualified person. Now, Mr. Wright ceased to be a qualified person in March. I do not lay stress on the fact that Dr. Lennox thought it right—to fulfil his honourable bargain—to keep his consulting-room in the old shop until May 28. My opinion rests on the broader grounds that a gentleman in Dr. Lennox's position, who cannot possibly be in the shop except on very rare occasions, must have a qualified assistant in that shop.

Mr. Hay: Would your lordship take into account the Act of 1869?

The Sheriff: I am reminded of the Act of 1869. The Act of 1869, according to Mr. Hay's argument is this, that if the shop had been merely in the position of an ordinary chemist's shop, you must have had a qualified assistant, but that a gentleman who is a doctor, and who was a doctor previous to the Act of 1868, and who had a right before that Act to have a shop, and to dispense through an unqualified assistant, has that right still. That depends on the reading of the section of the Act of 1869, which says that nothing contained in the first fifteen sections of the recited Act shall affect any person who has been registered as a regularly qualified practitioner before the passing of this Act. There are two readings of that section, viz., that a regularly qualified practitioner prior to the Act shall be entitled to sell and keep open shop; the other is that he may not keep a qualified assistant. I think the only reasonable reading is the first. I cannot think they are entitled to lay the risk on the public of having an unqualified assistant, although they cannot supervise themselves. The result is that the respondent is technically liable, but I am satisfied there has been a misunderstanding as to this point. I do not think it is a case for an extreme penalty. I do not thing it is a case for a penalty at all. I think it will serve the end of the prosecution without a penalty; and I dismiss the respondent with an admonition.

The Sheriff: Does the pursuer ask expenses?

Mr Shaw: I so entirely concur in the view taken by your Lordship as to the object of the prosecution having been attained that I will not press for expenses. With regard to the sale of poison by William Cassels, who occasionally assisted Wright in his business, I have to intimate that it is not our intention to proceed with the charge.

The Council of the Pharmaceutical Society of Great Britain *v.* G. F. Noble.

On the 11th inst., before His Honor Judge Greenhow, at the Leeds County Court, the Council of the Pharmaceutical Society of Great Britain sued G. F. Noble, of 29, Meanwood Road, Leeds, to recover a penalty of £5 under Section 15 of the Pharmacy Act, 1868, for taking, using, or exhibiting the name or title of druggist.

Mr. G. Banks, barrister, instructed by Messrs. Flux, Son and Co., appeared for the Society. Mr. Dunn, solicitor, appeared for defendant.

Evidence was given that defendant both over his shop and upon labels styled himself "Wholesale Druggist."

Mr. Dunn contended that as a wholesale dealer in drugs defendant was entitled to style himself "Wholesale Druggist," but he admitted that defendant did not deal in poisons.

His Honor gave judgment for the penalty sued for, viz., £5, with costs.

ANSWERS TO CORRESPONDENTS.

Proceedings of the Chemists' Assistants' Association.—We have been requested by the Secretaries of the Chemists' Assistants' Association to say, that owing to a mistake a few copies of the 'Proceedings' have been forwarded to members insufficiently stamped. Members who have had to pay extra postage are requested to communicate with the Honorary Secretaries, 103, Great Russell St.

J. Place.—We believe that the article mentioned is a proprietary preparation, for which antiseptic properties are claimed.

W. Frampton.—We cannot say who was the originator of the remedy. Some information respecting its earlier history will be found in the *Pharmaceutical Journal*, [3], xiii., 884.

G. H. Allen.—*Geranium striatum.*

F. Davis.—We do not think the subject is suitable for discussion, since the problem is one that will have to be solved by experiment. See Hardwick's 'Photographic Chemistry.'

Pharmacist.—The formula for syrupus calcii et ferri lactophosphatis in the 'Extra Pharmacopœia,' we are informed, works well. The lactates of calcium and of iron can be readily obtained in commerce.

W. Pilkington.—(1) The formation of a sediment in such a mixture, containing carbolic acid and tincture of hamamelis, is unavoidable. (2) Most dispensers would thin the extract first with a little water.

Communications, Letters, etc., have been received from Messrs. Bedford, Francis, Radway, Waller, Polack, Emigrant, May and Baker, Fletcher, E. S. C.

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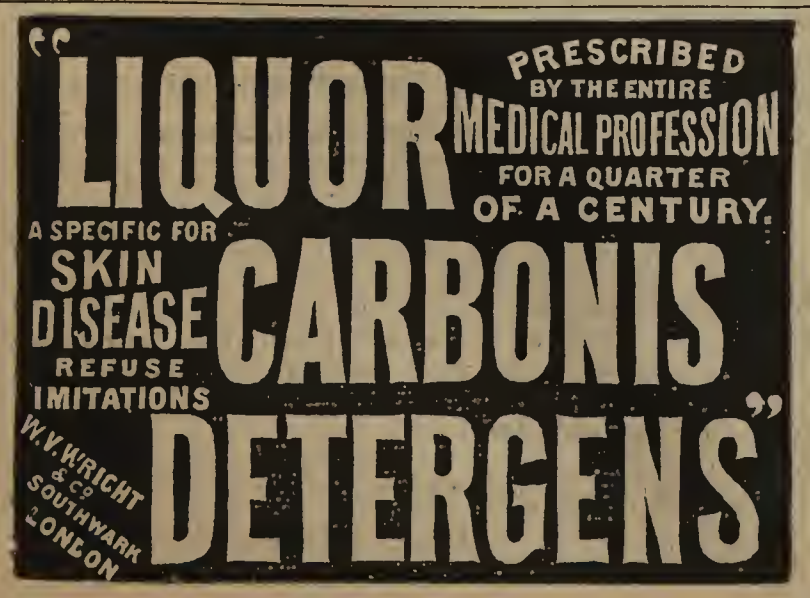

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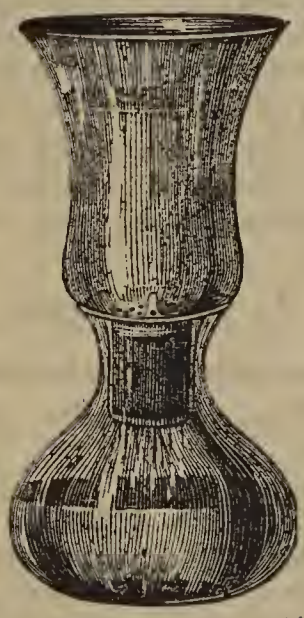

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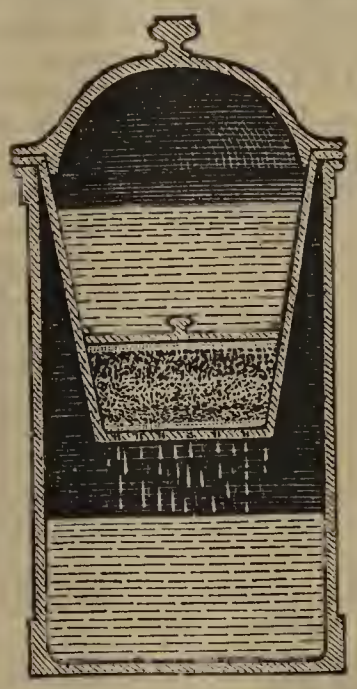

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 943.] SATURDAY, JULY 21, 1888. [PRICE FOURPENCE

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

SPECIAL NOTICE.

The Society's Libraries and Museums in London and Edinburgh will not be open in the evening during August and September. The Library and Museum in London will be closed during the first fortnight in September. The Library and Museum in Edinburgh will be closed from August 20th to September 4th, both dates inclusive.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

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SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

RESEARCH LABORATORY.

The Research Committee gives notice that there will be vacancies for six workers in the Laboratory next October. Applications should include a full account of the applicant's qualifications, and should be addressed to the Director of the Research Laboratory, 17, Bloomsbury Square, London, W.C.

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Regulations for the Laboratory.

Any person who desires to assist in the researches undertaken by the Director or who wishes to pursue an investigation on his own account may be admitted into the Laboratory as a worker by the Committee on the nomination of the Director, to whom written application is to be made for the purpose. A worker who desires to remain engaged in investigation for more than one year shall renew his application for admission each year.

Each worker will be expected before his admission to satisfy the Director of his competency, and if he wishes to undertake any particular investigation he must also furnish a statement in writing of its nature and extent.

Every worker will be furnished with gas and water, and, at the discretion of the Director, with such materials and apparatus as the worker may require. He will be expected, on being called upon by the Director, to reinstate such apparatus as he may damage.

No inquiry having a direct commercial object shall be conducted in the Laboratory.

The selection of subjects for investigation shall be left to the discretion of the Committee, assisted by the Director. The Director shall allow the utmost freedom to each investigator in the methods of research, so far as they are consistent with the orderly government of the laboratory. No publication of any research shall take place without the sanction of the Committee or Director, and in all cases the words "Communication from the Research Laboratory of the Pharmaceutical Society of Great Britain," or their equivalent, shall be appended to the title of each paper.

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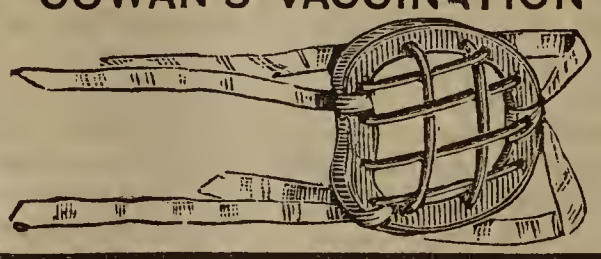

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HEAD-QUARTERS FOR SPONGES.

Telegraphic Address—"CUBANS LONDON."

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CRESSWELL BROTHERS

Sponge Importers & Merchants

SPONGES OF EVERY DESCRIPTION DIRECT FROM

GREECE, TURKEY, THE BAHAMAS, FLORIDA & CUBA.

2, RED LION SQUARE, LONDON, W.C.

(Next to Church), Also 1 & 13a, RED LION SQUARE.

IMPORTANT NOTICE TO THE TRADE.

NEW WHOLESALE PRICE LIST OF SPONGES.

CRESSWELL BROTHERS have just published the most comprehensive Price List of Sponges ever issued. It contains the lowest quotations for every variety, with special illustrated and descriptive matter, and a concise natural history of the sponge of commerce. All buyers should at once write for it.

SPONGES FOR THE SUMMER SEASON.

CRESSWELL BROTHERS make a specialty of the best Toilet and Bath Sponges for Druggists, both unbleached and bleached. All buyers who require Sponges of good shape, good texture and strong fibre, will find that Cresswell Brothers' goods combine those characteristics. A considerable saving will be effected by dealing direct with Cresswell Brothers, as they are the only firm who can place their goods straight into the shop of the retailer from the hands of the fishermen.

SAMPLE CASES SENT ON APPROVAL.

CRESSWELL BROTHERS, 1, 2 & 13a, Red Lion Square, (Next to Church), LONDON, W.C.

No connection with a Company trading under a similar name in the same Square.

THE BEST NATURAL APERIENT.

Persistent attempts are made by interested parties to deceive the public by offering Natural Mineral Aperient Waters with marks, names, and designations very similar to those which are used by the **APOLLINARIS COMPANY, LIMITED,** upon the **NATURAL MINERAL APERIENT WATERS** imported by them.

Under these circumstances the **APOLLINARIS COMPANY, LIMITED,** feel compelled to caution the public that the **HUNGARIAN BITTER WATER** sold by the **COMPANY** always bears the name of the **APOLLINARIS COMPANY, LIMITED,** on the Label, and a **RED DIAMOND,** which is their **TRADE MARK** of selection.

DEMAND THE DIAMOND MARK,

and insist upon receiving the **HUNGARIAN APERIENT WATER** of the **APOLLINARIS COMPANY, LIMITED.**

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GAZOGENES & POWDERS

ARE THE BEST.

POWDERS, GUARANTEED PURE TARTARIC ACID, & BICARB. SODA.

GAZOGENES, SELTZOGENES, & SYPHONS REPAIRED.

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The most Marvellous Medicine of the Age for Bilious and Nervous Disorders, Indigestion, and Female Complaints.

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Prepared only, and Sold Wholesale and Retail, by

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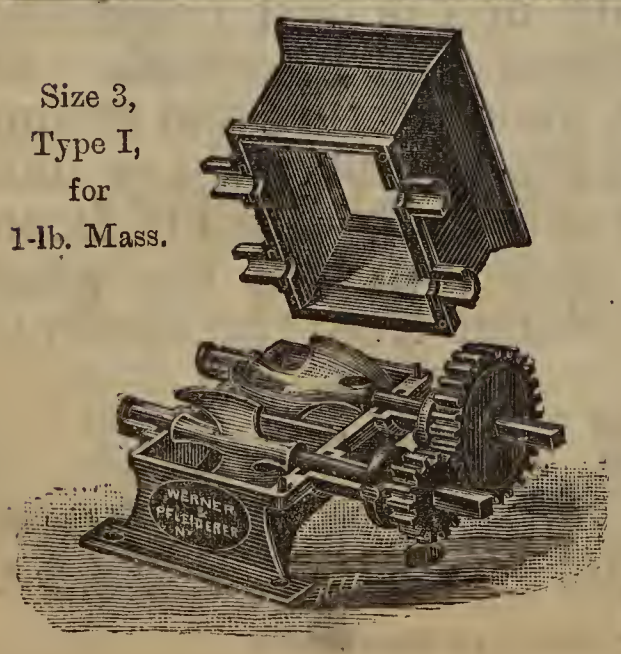

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KNEADING AND MIXING MACHINE

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ALSO FOR

Horse Balls, Tooth Pastes, Ointments, Soaps, Powders, and for general Mixing and Incorporating.

Replaces with advantage all other Appliances for these Purposes.

Made in various sizes, to do from ½ lb. up to 1 ton at a time.

WERNER & PFLEIDERER,

86, UPPER GROUND ST., BLACKFRIARS BRIDGE, LONDON, S.E.

PEARS' SOAP

A SPECIALTY FOR INFANTS

SIR ERASMUS WILSON, F.R.S. (*Late President of the Royal College of Surgeons of England*) Writes in the *Journal of Cutaneous Medicine*:—"The use of a good Soap is certainly calculated to preserve the skin in health, to maintain its complexion and tone, and prevent its falling into wrinkles. . . . PEARS is a name engraven on the memory of the oldest inhabitant; and Pears' Transparent Soap is an article of the nicest and most careful manufacture, and one of the most refreshing and agreeable of balms for the skin."

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SHOP FITTER,

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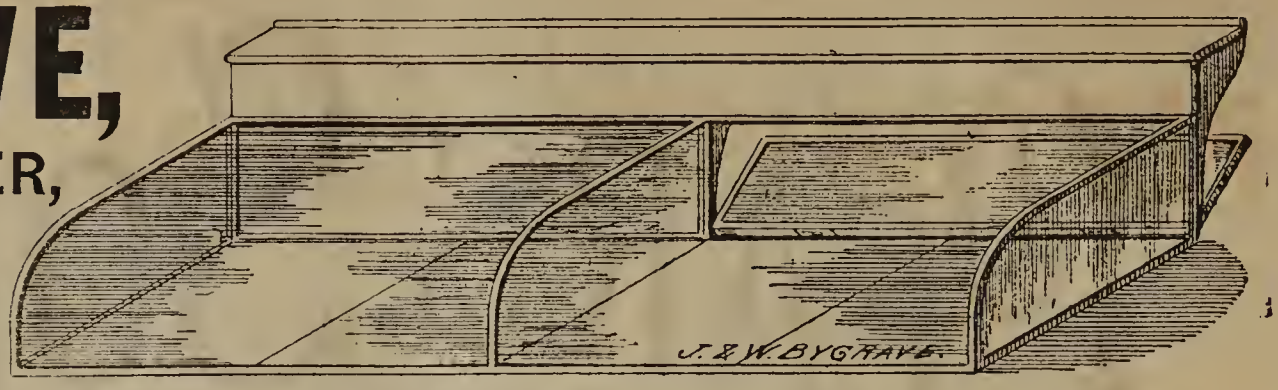
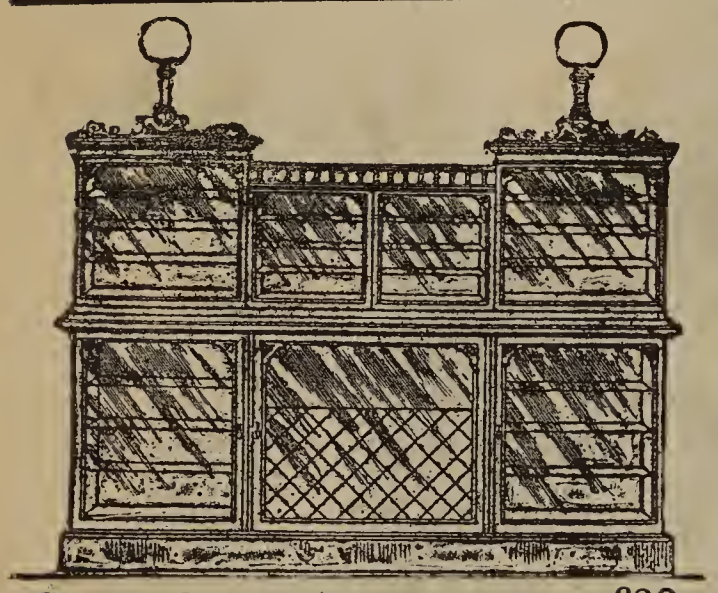
LONDON, N.



Bent-top plate-glass Counter Show Case, in French polished mahogany, with one upright and flat mahogany shelf on top for showing goods, &c.; doors at back lined with plate-glass mirrors and fitted with spring fastenings; the inside fitted with trays, lined crimson or blue cotton velvet. If 5ft. long, 16in. wide, 8in. high (total height 12in.), **£5.** 5 per cent. off for cash.



Six feet long, net - - - - - £20.
If the Dispensing Screen only - £10.

"THE SPECIAL" DISPENSING COUNTER.

Designed from the ideas of some of the leading Chemists and Dispensers in London.
The counter has a solid mahogany top and plate-glass case front, the centre part fitted to take sponge.
A mahogany screen on top, consisting of plate-glass cases.
The back of screen fitted with small shelves for dispensing bottles, and the inside of counter with strong counter drawers.

BOWLING & GOVIER,

SHOP FITTERS,
Gun St., Brushfield St.,
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Notice to the Trade.

In consequence of inferior Secondhand Goods being sold for our make, we have found it necessary to protect our reputation for best work with a Trade Mark, as above, and unless goods are so stamped we cannot be answerable.

W. HAWKE & SON

SHOP FITTERS AND SHOP-FRONT BUILDERS

WILD COURT, GREAT WILD STREET, DRURY LANE, LONDON, W.C.

Medical Glass, Earthenware, Utensils, &c.

CLOSED AT 5 P.M.; SATURDAYS, 12 A.M.

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Medical & General Shop Fitter,
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ESTABLISHED 1830.
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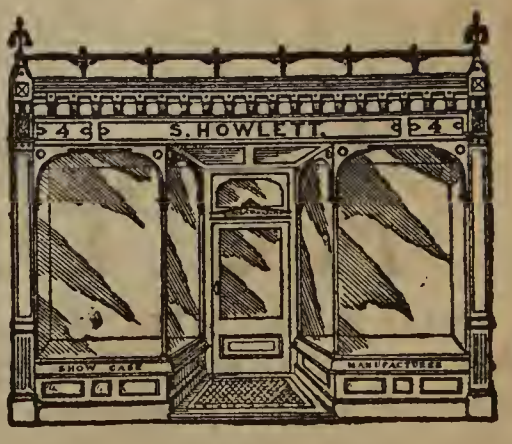
NUMEROUS REFERENCES may be obtained of Leading Chemists in all parts of the Kingdom.



SHOPS FITTED by Contract, in Town or Country, with every requisite, on the most improved principles, and at lowest prices.

A LARGE STOCK of New and Second-hand Fittings and Cases to be sold very CHEAP.

Export orders carefully Packed and Shipped. Plans and Estimates Supplied.

CONCENTRATED

PEPTONISED COCOA AND MILK

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PEPTONISED MILK

(PATENT)

These two preparations are made with pure rich PRE-DIGESTED Country Milk, and, by mere dilution with hot water, afford a delicious restorative beverage, the assimilation of which requires no digestive effort.

SAVORY & MOORE, LONDON.

Tins, 1s. 6d. and 2s. 6d. Obtainable everywhere.

"CARNABYN"

(REGISTERED)

A NOURISHING MEAT AND MALT WINE COMPOUND.

A stimulating tonic nutrient. DOSE—¼ to 2 ounces twice daily.

In Bottles, 2s. 6d., 5s., and 7s. 6d.

Of all Chemists and Wine Merchants, and the Manufacturers,

HOOPER & COMPY., Chemists, &c.,

55, GROSVENOR ST., and 26, DAVIES ST., W.; also at 7, PALL MALL EAST, LONDON, S.W.

Laboratory—MITCHAM, SURREY.

MAY & BAKER,

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PHENACETINE

THE NEW ANTIPYRETIC,

Has been already used with marked success in the treatment of Neuralgia, Vomiting, Pneumonia crouposa, Typhus Abdominalis, Morbilli, Sepsis Puerperalis, Pleuritis, Pyæmia, Typhus Recitativus, Meningitis Cerebrospinalis, Peritonitis, Perityphlitis, Parametritis, Angina.

WHOLESALE ONLY.

IMPROVED SYRINGES

FOR THE

INJECTION OF GLYCERINE

TO RELIEVE CONSTIPATION.

Prices to the Trade: PEWTER, 8/- per doz.; PEWTER, with Glass Barrel, 12/- per doz.; VULCANITE, 30/- per doz; VULCANITE, with Glass Barrel, 30/- per doz.; CELLULOID, with Glass Barrel, 42/- per doz.

S. MAW, SON & THOMPSON, ALDERSGATE STREET, LONDON.

Since the introduction of Pepsine by BOUDAULT and Dr. L. CORVISART, BOUDAULT'S Preparations have been considered the most reliable.

BOUDAULT'S PEPSINE.

The Paris Hospitals have used no other.

PARIS, 1867. *HAVRE*, 1868. *LYONS*, 1872. *VIENNE*, 1873. *PHILADELPHIA*, 1877. *PARIS*, 1878

Medaille Unique. *Medaille d'Argent.* *Medaille d'Or.* *Medaille de Merit.*

The Jury of the International Exhibition, Paris, 1867, awarded to BOUDAULT'S Preparations the *only* Medal given for Pepsine. Since that time it has taken the Medal at each of the International Exhibitions—Havre, Lyons, Vienna, Philadelphia, and Paris, 1878.

BOUDAULT'S PEPSINE—dose, 5 to 10 grains—in bottles, one ounce, 5/-; in bottles, half-an-ounce, 3/-
BOUDAULT'S PEPSINE WINE—dose, a tablespoonful—in bottles, 4/- and 8/-
BOUDAULT'S PEPSINE PILLS AND LOZENGES—dose, 2 to 4—in bottles, 3/3.

HOTTOT BOUDAULT, 7, Avenue Victoria, Paris. SQUIRE, 413, Oxford Street, London.

CAN BE HAD OF ALL CHEMISTS.

LOFTHOUSE & SALTMER,

Manufacturing Chemists, Wholesale & Export Drug Merchants,

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Manufacturers of all Pharmaceutical Preparations on the best and most improved principles.

QUOTATIONS ON APPLICATION.

SOLUT. ÆTHERIS NITROSI (Æther. Hyponit.)

1 part to 5 Sp. Vini Rect. 56 O.P. makes Sp. Æth. Nit. 850.

This concentrated preparation is carefully drawn in our own laboratory, is highly recommended, and is daily finding increased favour with the trade for making Sp. Nitre, as required for use, and thus avoiding the risk of a development of free acid, which is more or less prevalent in Sp. Nitre that has been drawn some time.

Price in Winchester Quarts, 3*s.* per lb., net.

SOLUBLE ESSENCES.

Specially prepared for Ærated Water Manufacturers, unequalled in Strength and delicacy of flavour as well as solubility.

SAMPLES ON APPLICATION.

SOLUBLE ESS. LEMON, in Winchester Quarts	3*s.*	3*d.*	per lb.
,, **ESS. ORANGE**, ,, ,, ...	3*s.*	3*d.*	,,
,, **ESS. GINGER**, ,, ,, ...	3*s.*	3*d.*	,,

USUAL TERMS

DRAPER'S INK (DICHROIC).

THE NEW BLACK INK, different from anything else ever produced.

Writing becomes a pleasure when this Ink is used. It has been adopted by the principal Banks, Public Offices, and Railway Companies throughout Ireland.

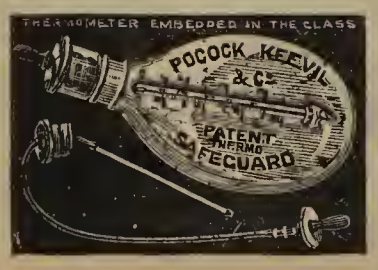
It writes almost instantly Full Black.
Does not corrode Steel Pens.
Is cleanly to use and not liable to Blot.
Flows easily from the Pen.
Blotting-paper may be applied at the moment of writing.

May be had in *London* from BARCLAYS, NEWBERYS, EDWARDS, SANGER, SUTTON. *Liverpool:* EVANS, SONS & Co., AYRTON & SAUNDERS. *Leeds:* GOODALL, BACKHOUSE & Co. *Exeter:* EVANS, GADD & Co. *York* and *Edinboro':* RAIMES & Co. *Newcastle-on-Tyne:* ISMAY & Co. *Coventry:* WYLEYS & Co.

SOLE PROPRIETORS:

BEWLEY & DRAPER, Limited, DUBLIN.

THE THERMO SAFEGUARD FEEDING BOTTLE.



Strongly recommended by the Medical Profession. Innumerable Testimonials.

RETAIL PRICES:—No. 1, 1s. No. 2, 1s. 6d.
No. 3, Superior quality, with both kinds of fittings, 2s. 6d.

All are fitted with pure black rubber fittings, or without tubing, as the Boat-shaped Bottle.

OF ALL THE WHOLESALE HOUSES, OR FROM

POCOCK, KEEVIL & CO.

72 & 74, WANDSWORTH ROAD, S.W. *Show Cards forwarded on application.*

HIGHEST AWARD AT AMERICAN EXHIBITION, LONDON.
SILVER MEDAL (1st Prize), NEWCASTLE EXHIBITION.
BESIDES MANY AWARDS AT PREVIOUS EXHIBITIONS.

ARTICLES WHICH PAY TO INTRODUCE

Because they are of the very best quality, and are put up most attractively, special samples and circulars being supplied for distribution.

The large demand in Great Britain for Colgate's Cashmere Bouquet Soap which has arisen in a very short time is the more remarkable because it has been created solely through the drug trade, without any newspaper advertisements.

The quality of the Soap, its handsome appearance and delightful perfume, make it sell on sight, while the distribution of the samples brings the customers promptly to the chemists who send them out.

See letter, "The Bright Side," in THE CHEMIST AND DRUGGIST, Nov. 5, 1887, p. 590; also Nov. 12, 1887, pp. 611 and 624.

Note opinion of THE CHEMIST AND DRUGGIST, Sept. 17, 1887.

A NEW SOAP.—The soap trade of chemists has greatly diminished, and has almost vanished so far as the lower qualities are concerned. The only chance for maintaining the returns from this department is to place novelties of a high-class character before customers, and we should think that there will be considerable satisfaction in introducing the Cashmere bouquet soap made by Messrs. Colgate & Co., of New York. This is a cream-coloured soap in oval tablets; it is remarkably pure and high-scented, and is put up in neat half-dozen boxes, with several elegant and artistic show cards. The agents, Messrs. Burroughs, Wellcome & Co., inform us that a liberal supply of sample tablets (one-fourth the regular size) are presented to the retailer, so that sales may be facilitated. It is the favourite soap in the "States."

THOUGH NOT A CHEAP SOAP,

Quality considered, Colgate's Cashmere Bouquet Soap is the best value in the market. It is made from a special stock which is not employed by any other soap maker in the world.

SAMPLES—SPECIAL OFFER.

Until further notice, with each dozen of Colgate's Cashmere Bouquet Soap ordered of us, or through the wholesale houses, we will supply 1 doz. samples for free distribution if a request for same be made on order. The samples are one-fourth the size of the regular soap and are much appreciated by all who receive them.

With large orders we will supply special circulars to accompany samples bearing chemist's name and address only. Colgate's Cashmere Bouquet Soap has the largest sale of any superfine toilet soap.

Price, retail, 1s. 3d.; per dozen, 10s.; per gross, 110s. nett.

ORDER AT ONCE. IT WILL PAY YOU TO DO SO.

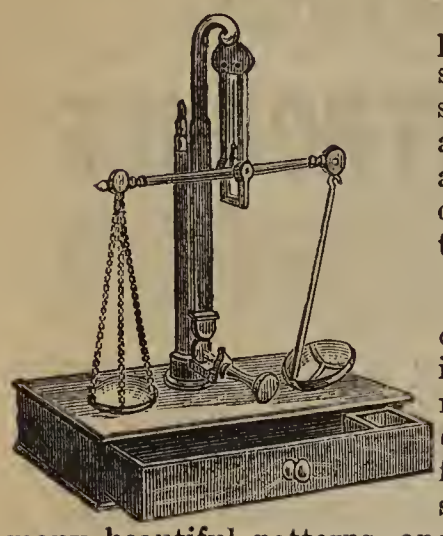
COLGATE'S
Cashmere Bouquet Perfume.

This exquisite odour, like that of the soap, is as distinctive as it is delicate and lasting. It is exceeding popular with the *élite* of society wherever it becomes known.

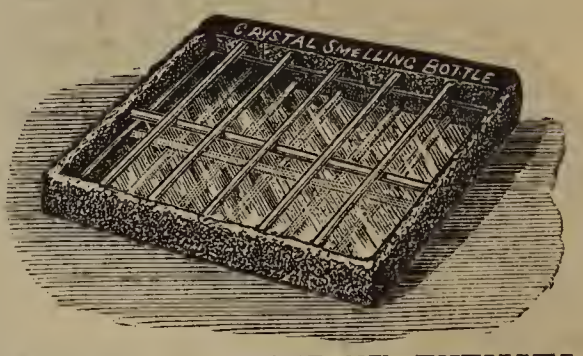
Prices: 1 oz., 2s. 6d. retail; 22s. doz.; 21s. 3d. in gross lots.
2 oz., 4s. retail; 30s. 9d. doz.; 29s. 7d. „ „
Also supplied in bond at special rates.

COLGATE & CO., 67, Holborn Viaduct, London, E.C.

NOVELTIES AND SPECIALITIES.



The above illustration represents a new form of dispensing scales, fitted into a polished mahogany box with brass fittings. The inconvenience of the old style of scale, which required one hand to be employed in pressing down the lever in order to swing the beam, is well known. In this apparatus a turn of the handle raises the arm, and the form of the lever maintains the scale-pans in any position required, without any effort on the part of the manipulator. Two glass pans are provided and a set of drachm weights from ʒij. to ½ gr. The workmanship and finish of the article is all that can be desired, and the price the same as that of the ordinary scale. Each 26/6.



The Crystal Smelling Bottle Case consists of a small mirror, set about three-quarters of an inch deep in a red plush frame. In front of the mirror are five vertical bars of solid glass, crossed in the middle by one horizontal, which form twelve shallow receptacles for the crystal smelling bottles. These bottles are supplied in many beautiful patterns, and the whole, when fitted, forms a strikingly handsome and attractive ornament for the window or counter. Complete with bottles, 10/-

THE

"MOTHER" TEETHING PAD.

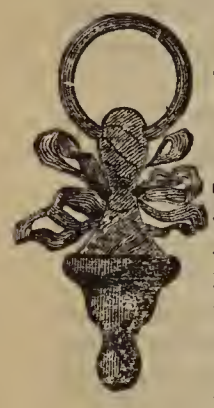
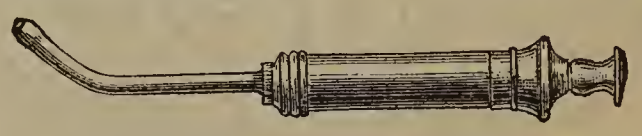


Fig. 359A. — Registered No. 95099. The most perfect imitation of the natural breast. The teat is self-inflating; has no hole, so that the child cannot draw in air; handsomely mounted on an attractive show card with chromos. Per doz., 4/6. Do., shilling size, vegetable ivory, with superior ring. Each in a box. Per doz., 8/-

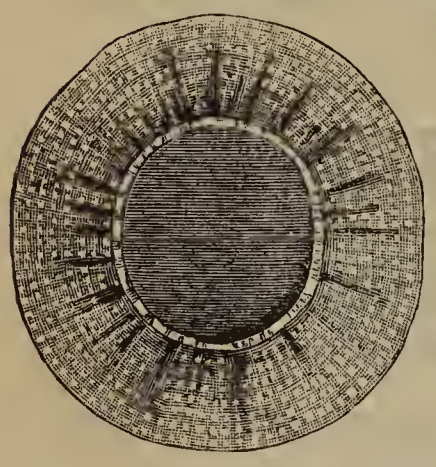
THE NEW SYRINGE FOR GLYCERINE ENEMATA

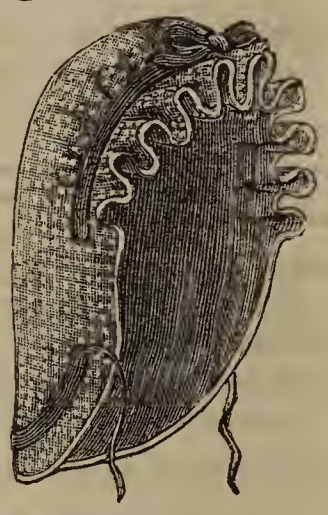


This little syringe is introduced for the administration of the glycerine enemata recently recommended for obstinate constipation. The article is well made of vulcanite, and the piston is of the approved hour-glass leather form, obviating the inconvenience generally attendant upon the common variety packed with thread. Price—Pewter, 8/6. Vulcanite, 24/- doz.

SEASONABLE REQUIREMENTS.

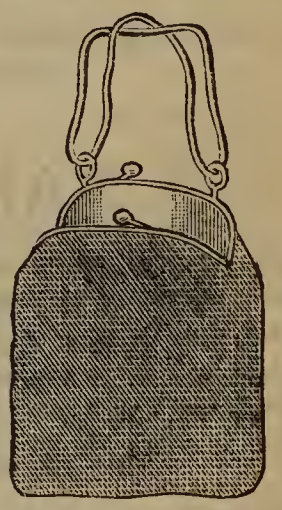
BATHING CAPS.



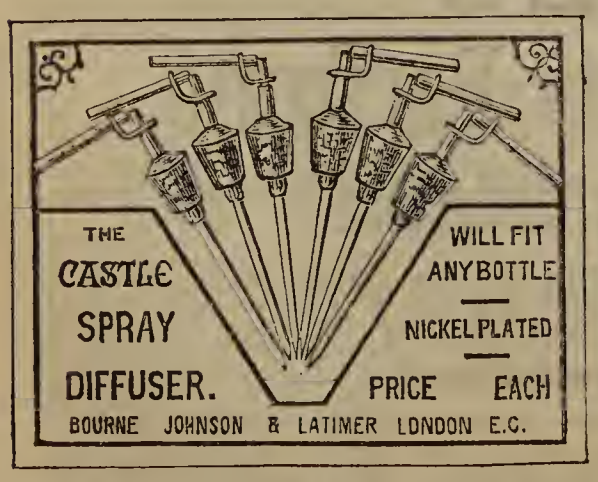


Circular Shape, in a variety of patterns, drab, check, lustral, and coloured ...	per doz. 8/6
Do. do. Oiled Silk	„ 16/-
Normandy Shape, assorted patterns ...	„ 12/-

SPONGE BAGS.



First Quality, Check ...	6/-	7/-	9/-	11/-	12/6	16/-
Second Quality	5/-	6/-	8/-	9/-	10/-	14/-
	No. 1	2	3	4	5	6
With Ball Fastenings ...	12/-	15/-	18/-	21/-	24/-	



The "Castle" Spray Producer

NICKEL-PLATED.

Six on an attractive Show Card. Per doz., 4/-.

WASHING GLOVES

Turco (white)	per doz. pairs, 3/-, 5/6
Baden and Calefacio (brown)	„ „ 6/6
Scarboro' and Hastings...	„ „ 6/6

A glass-top box, containing a well assorted dozen, for 6/6.

Less 10 per cent. for cash.

BOURNE, JOHNSON & LATIMER, 34 & 35, Furnival St., London, E.C.

A NEW BASE IN TEA.*

BY A. KOSSEL.

In the examination of large quantities of tea extract received from Dr. Fr. Witte, of Rostock, I have ascertained the presence of a new base that is associated with theine in minute proportion. The syrupy extract was operated upon in the following manner. After mixing with water sulphuric acid was added to separate smeary products, and the resulting liquid was supersaturated with ammonia. Ammoniacal solution of silver nitrate was then added, and the precipitate thus formed was collected by filtration. The precipitate was digested with warm nitric acid, the mixture filtered to separate silver salts that had deposited, and the filtrate made alkaline with ammonia. In the course of twenty-four hours a brownish amorphous precipitate was deposited, which contained the new base in the state of a silver compound, and by evaporating the clear filtered liquid a further quantity of this silver compound was obtained. After separating the silver from this compound by treatment with sulphuretted hydrogen and filtering, a small quantity of xanthine was deposited from the clear filtrate,† and upon concentrating the liquid the new base partly crystallized out. The mother-liquor was then mixed with mercuric nitrate solution, the precipitate collected by filtration, and the filtrate made alkaline with sodic carbonate solution. A white precipitate was thus obtained in both cases, which consisted almost entirely of a mercury compound of the base.

Analysis of the new base, for which I suggest the name "theophylline," gave the following results :—

	I.	II.	III.	Calculated for $C_7H_8N_4O_2$.
C . .	46·55	46·63	—	46·67
H . .	4·70	4·77	—	4·44
N . .	—	—	31·66	31·11

The crystals contain one molecule of water, which is given off by heating to 110° C.

The composition of theophylline is the same as that of theobromine, as well as that of paraxanthine obtained by Thudichum and Salomon from urine, but the characters of the base are different from those of either substance. The crystals are larger than those of theobromine, and the latter do not contain water. Theophylline is much more soluble in water than theobromine, and on the addition of a very small quantity of ammonia it dissolves very readily apparently in any proportion, while theobromine is but sparingly soluble in strongly ammoniacal water. The crystals of paraxanthine have been examined by Arzruni, and Dr. Scheibe has compared the crystals of theophylline with his description, with the result that they do not correspond. The melting point of theophylline is about 264° C., while that of paraxanthine obtained from Dr. Salomon is 280°. Theobromine sublimes at 290° C. without melting. Theophylline also sublimes at a temperature above its melting point.

Theophylline forms definitely crystallizable salts with hydrochloric and nitric acids, platinum chloride and gold chloride, as well as a crystallizable sparingly soluble double salt with mercuric chloride. In a pure state the base is not precipitated from a dilute solution by mercuric nitrate.

Paraxanthine forms, as Salomon showed, a sparingly soluble compound with soda, which separates in crystals on adding caustic soda solution to a dilute solution of the base. Theophylline also forms a compound with soda, but it is readily soluble, this difference between the two bases being very marked.

Theophylline resembles theobromine in forming a silver compound which separates in an amorphous state on adding silver nitrate to a water solution of the base. This compound is soluble in warm ammonia, and on cooling the solution it crystallizes out. The compound thus obtained and dried at 130° C. contained 37·18 per cent. of silver, corresponding to the formula $C_7H_7N_4O_2Ag$. This silver compound dissolves readily in nitric acid.

When theophylline is mixed with chlorine water and the liquid evaporated, a scarlet-coloured residue is left, which becomes violet on addition of ammonia, just as is the case with theobromine.

The great similarity between the characters of theophylline and theobromine suggest that these substances are both derivatives of xanthine, and with that idea the introduction of the methyl group was attempted. By heating the silver compound with a calculated proportion of methyl iodide and some methyl alcohol in a closed tube for twenty-four hours at a temperature of 100° C. a crystallizable product was obtained which showed on analysis that a methyl group had been taken up, the composition and characters agreeing perfectly with those of caffeine. The melting point of the substance thus obtained was 229° C., and accordingly from this experiment it may be inferred that theophylline is a dimethylxanthine. The positions of the methyl groups have yet to be determined by an oxidation experiment.

* *Berichte der deutschen chemischen Gesellschaft*, 1888, No. 11, p. 2164.

† The occurrence of xanthine in tea was ascertained some four years ago by Dr. Adolph Baginsky, who undertook the search for it at the suggestion of Dr. Kossel (*Zeits. f. Physiol. Chemie*, viii., 395). For that purpose tea was extracted with dilute sulphuric acid, the clear liquor mixed with excess of baryta water and then treated with carbonic acid to remove the excess of baryta. After filtering and evaporating, ammonia and silver nitrate were added, and the precipitate of xanthine silver thus obtained, crystallized from solution in dilute nitric acid mixed with some urea. This salt contained 33·6 per cent. of silver, very nearly the amount required by the formula $C_5H_4N_4O_2AgNO_3$. The quantity of the silver compound obtained from one pound of tea was only 0·1567 gram.—ED. PHARM. JOURN.

THE ASAFŒTIDA PLANTS.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society of Great Britain.

(*Continued from page* 24.)

II. FERULA FŒTIDA, *Regel. Act. Hort. Petrop.*, v. Fasc, vi. p. 590. Syn. *Scorodosma fœtidum*, Bunge, 'Plantæ Lehmannianæ,' p. 309. *Ferula Scorodosma*, Bentley and Trimen, 'Med. Pl.', No. 127.

In the Aralo-Caspian district the native name of the plant is *Sassyk Karai or Keurok-Karai*; in Bucharia *Sassyk-Kawai or Kawai* (Borsczow); and in Afghanistan *Anguza-kema* (Aitchison).

This plant was first collected by Lehmann in 1841, in the marshy desert east of the Aral Sea, and in the Karatau range of mountains between the River Sarjawschan and the Oxus, and east of

Bucharia and Samarkand. In the year 1846 the same plant was described by Professor von Bunge in the 'Delect. Sem. Hort. Dorpat,' and referred to a new genus *Scorodosma*, and in 1851 a full detailed description was given by the same botanist in 'Pl. Lehmannianæ,' from which the following quotation is made :—*

"*Scorodosma fœtidum*, Bunge, 'Pl. Lehm.,' p. 309, No. 549. (Descr. of genus ex 'Delect. Sem. Hort. Dorp.,' 1846, p. 3.) Folium radicale, peracta fere anthesi adhuc vegetum, cum petiolo brevi fere sesquipedale, ex toto pube brevi molliter canescens, glaucum. Petiolus communis crassitie digiti minimi, plus quam bipollicaris, subtus convexis supra planiusculus, subdepressus semiteres haud angulatus, striatus, dividitur in petiolos partiales tres: medium quadripollicarem, laterales vix sesquipollicares; segmentum primarium medium bipinnatisectum; segmenta secundaria 7, terminale longius, lateralia breviter petiolata, inferiora semipedalia, divisa in segmenta tertiaria 9, superiora sensim minora, segmentis paucioribus. Segmenta tertiaria (in toto folio circa 115), plerumque bipollicaria, vel parum minora, interdum plus quam tripollicaria, pollice dimidio sæpe latiora, oblonga, inæquilatera, inferne plus minus longe decurrentia, margine integerrima, vel rarius hinc inde undulato-sublobata, obtusa. Segmenta primaria lateralia quinquejuga cum impari (segmentis secundariis igitur 11); cœterum medio similia, at minora. Folium caulinum adest unicum. Vagina amplissima explanata basi 4–pollices lata, circiter tres pollicares longa, extus molliter villosa-lanata: lamina in vagina sessilis, plus quam semipedalis et 10 circiter pollices lata, palmato-quinque-secta, segmento medio longius petiolato, duobus extimis subsessilibus omnibus bipinnatisectis; segmentis tertiariis ut in folio radicali, sed minoribus et paucioribus, circiter 90. Vaginæ superiores aphyllæ, villosissimæ, sub inflorescentiâ numerosæ. Inflorescentiæ partes adsunt tres; altera, cum caulis summa parte diametro fere pollicari, vaginis pluribus confertis instructa, ex quarum axillis prodeunt rami, umbellas compositas minores umbellatas steriles, intermixtis umbellulis imperfectis hermaphroditis fertilibus, gerentes, crassitie pennæ anserinæ, tres pollices longi; altera sistit tres radios multo crassiores, 5–6 pollices longos, in cujusvis apice umbella magna fœminea sessili et sub hac pluribus umbellis minoribus hermaphroditis vel masculis pedunculatis; tertia denique pars constat e radiis septem umbellæ, quantam e basi dimidiata, plusquam pollicem crassa concludere licet, verosimiliter maximæ, 5–6 pollices longis, calamo scriptorio crassioribus, apice umbellam fœmineam defloratam compositam gerentibus, hinc inde cum rudimentis vel cicatricibus umbellarum sterilium delapsarum. Involucra et involucella nulla. Umbellæ masculæ subglabratæ et hermaphroditæ parce villosulæ graciles, pedunculis plerumque bipollicaribus suffultæ, 7–16 radiatæ, radiis semipollicaribus vel brevioribus, umbellulis sub 10 floris, radioli $1\frac{1}{2}$ lin. longi. Petala reflexa subpersistentia lineam circiter longa læte flava, glabra. Flores hermaphroditi similes, sed ovario distincto, stylisque elongatis, illis florum fœmineorum similibus præditi, abortivi vel fertiles, umbellæ fœmineæ validiores, 16–21 radiatæ, radii 1–2 pollicaribus patulopilosi. Umbellulæ villoso-lanatæ 20–25 floræ; radioli breves; petala persistentia alba vel saltum albescentia, paulo majora, quam in floribus masculis. Mericarpia demum fere omnino glabrata, matura 5 lin. longa, 4 fere lin. lata. Semen paulo brevices $2\frac{1}{2}$ lin. latum. Cætera generis.

"In 'der Lehmsteppe zwischen Tschakyi Ata und Nasarbai,' Kuduk, 12th April, 1842 (speciminis unici florentis singulæ partes et umbella fructifera anno antecedentis cum Doremate collecta).

"SCORODOSMA.—(*Generic Characters*)—Flores abortu polygami; Mas:—Calyx obsoletissime quinquelobus; petala quinque obovata, obtusa, integra, plana vel vix concava flava; stamina quinque petalis multo longiora. Stylopodia lata depressa. Styli brevissimi abortivi. Fem:—Calycis limbus obsoletus; petala obovata, obtusa integra plana albescentia. Glandulæ quinque minutæ, subbilobæ, staminum loco, in annulum urceolatum coadunatæ. Stylopodia vix elevata. Stylo duo reflexi stigmata crasse capitata. Fructus a dorso compressus, suborbicularis, jugis tribus dorsalibus, æque distantibus carinatis, lateralibus inæqualiter dilatatis hinc in marginem convexum lævem nervo marginatum illinc in marginem medio carinatum. Vittæ in valleculis et commissura convexa striatis, nullæ! Carpophorum bipartitum liberum. Semen plano-compressum, ellipticum, pericarpeo arcte adhærens."

The plant was subsequently observed by Professor Bunge during his travels in Persia in 1858 and 1859, and its distribution in Persia noted. It was also collected during the same period by Borsczow in the northern part of the district lying between the Caspian and Aral seas, and a detailed account of its distribution and habit of growth is given in 'Die pharmaceutisch-wichtigen Ferulaceen der Aralo-Caspischen Wüste,'* together with excellent illustrations of the plant.

This plant was still later observed by Dr. J. E. T. Aitchison in Afghanistan, growing in abundance on the great shingle and conglomerate plains lying between the hills and the beds of rivers, at an elevation of from 2000 to 4000 feet. These are traversed by what are usually dry water-courses, which once in every two or three years, on the occurrence of heavy falls of snow on the hills above or local showers of rain, suddenly become roaring torrents. The *Ferula fœtida* generally grows in company with *Dorema Ammoniacum* (which has almost exactly similar foliage), covering the plains with a mass of splendid verdure from April till the beginning of July.

The flowering stem grows 3 to 5 feet high from a perennial rootstock which produces annual radical leaves for several years without flowering, so that only about one plant in a hundred is seen in flower. The first appearance of the inflorescence resembles a large cabbage head, due to the large sheathing leaf-bases which overlap and enclose the young umbels. In a few days these heads are transformed into the semblance of a cauliflower, and the stem then rapidly shoots upwards to a height of 4 or 5 feet, being remarkably massive for the size of the plant. The inflorescence is globose and from 1 to 2 feet in circumference. The young stems are eaten raw or cooked by the Afghans after removal of the leaf-sheaths. The plants which bear flowering stems are distinguished by the name of *kurnê kerna*; the plants not bearing flowers being considered to be a different kind, and are apparently distinguished by the name of "khora kema" (khora—a domed structure placed over the incised root) or "anguza kema."†

The two species above described, *F. Narthex* and

* The characters of the new genus are here quoted also, notwithstanding that the genus is now sunk in *Ferula*, since the description of the flowers would not otherwise be complete.

* 'Mém. de l'Acad. Imp. des Sc. de St. Pétersbourg' (ser. vii.); tom. iii., no. 8; taf i., ii., p. 16–26.

† *Pharm. Journ.*, [3], xvii., p. 465-466; and 'Linn. Trans. Bot.,' [2], vol. iii., pt. I., p. 68, pl. xii., xiii.

F. Scorodosma,* are so extremely similar in leaf that it may be well to direct attention to the chief distinction between the two plants. *F. Narthex* has yellow petals which are quickly deciduous, and the fruit has conspicuous vittæ, one or more between each rib of the fruit, the vittæ being slightly branched—almost like laticiferous vessels. The umbels are regularly distributed from the bottom to the top of the stem. In *F. Scorodosma* the petals are white, conspicuous, and persist even after the young fruit is formed. The fruit has no vittæ visible to the naked eye (although very small vittæ may be seen on transverse section). The umbels are collected together near the top of the stem, giving a rounded appearance to the whole inflorescence. The whole plant, but especially the inflorescence, is much more hairy than *F. Narthex*, the hairs having a crisped woolly appearance.

I have carefully examined Kæmpfer's fragmentary specimen at the British Museum and quite agree with Dr. Trimen's opinion that his plant is rightly referable to this species. The vittæ are indistinct and the peculiar crisp hairs of the species are visible on the leaf segments. It certainly cannot be Falconer's plant, in which the vittæ are distinctly visible.

III. Ferula Asafœtida, Regel.—Under *F. Asafœtida*, Boiss. ('Fl. Or.,' p. 994) Boissier mentions that the flowers are yellow, and yet identifies it with the *Scorodosma fœtida* of Bunge, in which the flowers are white and persistent. Dr. Regel, on the contrary ('Gartenflora,' 1878, p. 197), separates Boissier's plant from *Scorodosma fœtida*, Bunge,† as a distinct species, adopting Boissier's description and name ('Fl. Orientalis,' p. 994, exclusis synonymis). Boissier's *F. Asafœtida* must therefore now stand as *Ferula Asafœtida*, Regel. This plant, of which Dr. Regel says he has seen specimens from near Herat, and which he states grows also in Persia, is distinguished from *F. fœtida*, Regel (*Scorodosma fœtidum*), by its yellow deciduous corolla, by the peduncles becoming strongly thickened at the base, and by the wing of the fruit being only as broad as half the seed. Both this species and *F. fœtida*, Regel, have crisped hairs on the umbels. Boissier's description of the plant is as follows:—

"*F. Assafœtida*—Caule crassissimo tereti elato inferne foliato superne dense et subumbellatim paniculato, foliis puberulis minuteque glandulosis vel cinerotomentellis radicalibus petiolatis amplis ternatisectis divisionibus bipinnatisectis segmentis oblongo-lanceolatis obtusis decurrentibus, foliorum caulinorum vaginis ampliatis, vaginis membranaceis oblongis cucullatis ad basin ramorum inflorescentiæ, umbellis pedunculis demum crassissimis suffultis, radiis 20-30 pedicellisque brevissimus villosis, demum incrassatis, ovario villoso, petalis luteis glabris, mericarpiis ovatis vel suborbiculatis sparsim puberulis vel glabrescentibus margine dimidio semine sublatiore cinctis, jugis dorsalibus prominulis, vallecularum et commissuræ vittis indistinctis. Caulis orgyalis et biorgyalis, inflorescentiæ sæpe compositæ rami et pedunculi approximati alterni et verticillati crassi, radii umbellæ fœmineæ sesquipollicares, folia radicalia sesquipedalia segmentis 1-2 pollices longis, mericarpia 5-6 lineas longa 4-4½ lata."

IV. Ferula fœtidissima, Regel and Schmalhausen,* 'Gartenflora,' 1878, pp. 195–198, taf. 944. This species was discovered in Turkestan during the Fedtschenko expedition by Madame Olga Fedtschenko in the province of Kokand, near the river Isfairan, at an altitude of 8000 feet; at Alai, in the valley of the river Sarawschan, near Obburdeen, and at Pachud (5000 feet); and in passes near Oalik (3000 feet); and appears to have first been fully described by Dr. Regel in 'Gartenflora,' 1878, pp. 195–198, in which it is figured on taf. 944. The following is the description of the plant given by Dr. Regel:—

"*Ferula fœtidissima*, Rgl. and Schmalh. Caulis clatus, ramosus, teres, *glaber*. Folia minute hirtula; inferiore petiolata, trisecta, segmentis pinnatisectis, foliolis lanceolatis decurrentibus simpliciter v. duplicato crenato-serratis. Umbellæ *multiradiatæ* nunc omnes pedunculatæ fertiles; nunc centralis sessilis fertilis basi prolifera, laterales pedunculatæ polygamæ fertiles. Involucra involucellaque nulla v.-involucellum umbellarum lateralium pleiophyllum breve. Pedicelli glabri, nec incrassati, quam fructus 3–4plo breviores. Calycis dentes lanceolati. Petala parva *ex albido luteola*, mox decidua. *Stylopodium* carnosum, cyathiforme profunde 5-lobum, lobis truncatis emarginatis. Styli recurvati, stylopodium duplo superantes. *Fructus fœtidissimus*, maturus plano-compressus, *ovato-oblongus*, 1¼-3 cm longus, glaber, ala semini quadruplo angustiore cinctus. Mericarpii jugis dorsalibus, tribus paullo prominentibus, lateralibus cum ala confluentibus, vallecula *vitta solitaria satis lata* instructæ; commissura plana, 6-vittata. Huc verosimiliter *Ferula Asafœtida*, L., pertinet. Patria: Turkestania."

Dr. Regel remarks that this plant not only secretes more asafœtida than any other asafœtida plant, but that the odour is the most penetrating and the strongest of all of them, so that the investigation of the fruit under a lens or microscope is followed by a headache. He therefore believes it to be the true asafœtida plant. By the natives of Turkestan it is called "Tschair." This name is, however, apparently not confined to *F. fœtidissima*.

By the above-named authors this species is placed in a section *Euferula*, distinguished chiefly by having 1–3 well marked vittæ between the ribs of the outer surface of the mericarp and six on the commissure, and consequently in this respect closely allied to *F. Narthex*.

A specimen of this plant, erroneously labelled "*Ferula Scorodosma*," from "Turkestan," was presented, a few months since, by Professor Tichomorow, through Mr. Andrew Ferrein, of Moscow, to the Museum of the Pharmaceutical Society, and was exhibited at the evening meeting on March 14 last. I then pointed out that the specimen could not belong to *Ferula Scorodosma*, Benth. and Hook, since that species, like *F. Narthex*, has leaflets with entire margins, while those of the Turkestan plant are markedly serrate. It possessed, however, like those species, a powerful alliaceous odour. On subsequently examining the collections at Kew and the British Museum, in the endeavour to identify the plant, it was evident that it was not represented in either of our great national Herbaria. At Kew, however, several specimens of a species closely re-

* Mr. Lindsay, of Edinburgh Botanical Gardens, tells me that the leaf segments of *F. Scorodosma* are not so broad as in *F. Narthex*.

† Dr. Regel retains for his *F. fœtida* the description given of *Scorodosma fœtida* in 'Reliq. Lehm.,' No. 569, by Bunge, as well as that given by Borsczow ('Mém Act. Petrop.,' ser. vii., tom. iii., tab. 1, 2).

* See also 'Bull. Imp. Soc. of Friends of Nat. Hist., Anthropology and Ethnology,' 1882, vol. v., p. 593; and 'Act. Hort. Petropolitani,' 1877, vol. v., fasc. vi., p. 593.

sembling it in shape and character of the leaves were found under the name of *Ferula Jaeschkeana*, Vatke, chiefly from Cashmere, but these had no alliaceous odour. The labels on these specimens intimated that they were considered at Kew to be identical with *Ferula fœtidissima*, Regel and Schmalh., from Turkestan. On inquiry of Dr. C. B. Clarke, who had gathered the plant, I found that he had no recollection of *F. Jaeschkeana* possessing a strong alliaceous odour. Nevertheless, *F. Jaeschkeana*, Vatke, and *F. fœtidissima*, Regel, are given as synonymous in Hooker's 'Flora of British India,' vol. ii., p. 708. Believing, however, that Dr. Regel would hardly have given the name of *fœtidissima* to a plant which was not extremely fœtid, I turned to his original description in 'Gartenflora,' 1878, pp. 195–198; taf. 944.

From this it appeared (see above description) that *F. fœtidissima* possesses a powerfully alliaceous odour, that the fruit has large distinct vittæ, and that the umbels are numerous, in which characters it differs entirely from *F. Jaeschkeana*.

That there may no longer exist any confusion between the two species, Vatke's original description of *F. Jaeschkeana* is here reproduced from the publication ('Cat. Sem. Hort. Berol., 1876, App., p. 2) in which it originally appeared, but which is not as a rule easily accessible to botanists. The distinctive characters as compared with *F. fœtidissima* are italicized in the following description of *F. Jaeschkeana*.

F. Jaeschkeana:—Vatke in 'Cat. Sem. Hort. Berol,' 1876, app., p. 2, "caule elato *striato* rubello superne ramoso, foliis bipinnatisectis, segmentis ovali-oblongis obtusis crenatis decurrentibus, vaginis membranaceis ad basin ramorum inflorescentiæ, pedunculis fructiferis *crassioribus*, radiis 7–8 pedicellisque brevissimis demum *incrassatis*, ovario glabro, petalis *luteis* glabris, mericarpiis *ovalibus* glabris margine *angustissime* cinctis, jugis dorsalibus prominulis vallecularum et commissuræ *vittis indistinctis*.

"In *Angustiis Rotang dictis*, Himalaya, alt. 14–15000 peduncoll, Jaeschke, anno 1867. Tota planta glabra, præter folia precipue in pagina inferiore secus nervos venasque minute adpressa hirtella, segmenta inferiora ad 1 dcm. longa, ad 3–5 cm. lata, pedunculi demum crassiores quidem haud vero incrassati, involucrum involucellumque oligophyllum, phyllis minutis albocoloratis; fructus 1–4 cm. long. ad 8 mm. latus."

Having thus ascertained that the *F. Jaeschkeana*, Vatke, was not identical with *F. fœtidissima*, Regel, and that the Turkestan plant presented by Professor Tichomorow did not present the characters of the former, it remained to compare it with the latter. A section of the small immature fruit showed that there were well marked vittæ between the ridges of the mericarp, and six on the commissure, and the strongly alliaceous odour of the plant and the numerous rays of the umbels agreed well with Regel's description of *F. fœtidissima*. To make sure of their identity, however, I obtained through the kindness of Mr. Ferrein mature fruits of the Turkestan plants. These on comparison were found to agree in every respect with Dr. Regel's description. Consequently there could be but little doubt as to the identity of the plant presented by Professor Tichomorow. The confusion between *F. fœtidissima* and *F. Scorodosma* (=*F. fœtida*, Regel) appears to be widespread, since a specimen of the former is now growing at Kew Gardens, which came indirectly from Germany under the name of the latter plant.

Although this species is evidently, from its powerful odour and milky juice, very rich in gum resin, there appears to be no actual evidence that it is used as a commercial source of asafœtida, although it is hardly likely that such a valuable source of a marketable commodity could be long overlooked.

It may here be pointed out that the fruits of *F. fœtidissima* are much smaller than those of *F. Jaeschkeana*, and are so like those of *F. Narthex* that in spite of a difference of habit of growth the first named plant species must be placed with the last.

(*To be continued.*)

THE DETERMINATION OF THE AMOUNT OF MORPHINE PRESENT IN OPIUM.

In a recent communication to the *Chemical News* (March 9 and 16), Messrs. Teschemacher and J. Denham Smith pass in review several processes for the determination of the amount of morphine in opium. After a preliminary objection to the B.P. process of 1867, as well as Prollius's process and its modification by Petit, on the ground of the large quantities of alcohol employed, they turn to the method of Flückiger, extracted from the German Pharmacopœia Report, by which, after the treatment of the dried opium by ether, to remove wax, narcotin and colouring matter, the residual opium is exhausted by water, and a known portion of this solution by a mixture of ether and alcohol of 0·815 specific gravity; afterwards mixed with ammonia, the morphia being collected after the expiration of twenty-four hours. Here, again, they object that the quantity of alcohol must interfere with the correctness of the results, and they point out that this conclusion appears to have been experimentally arrived at by Mylius, who found the determination of morphia by this process to be below the truth. Mylius, however, proposes to add a given weight to that of the morphia obtained, to ensure, in his opinion, a correct result. This, however, in the eyes of Teschemacher and Smith is "an unpardonable sin in an analyst, as tampering with the actual results, and thus leading directly to untrue and fallacious results."

Reference is then made to the method devised by Dr. Squibb, based on Flückiger's method (*Pharm. Journ.* [3], xii., 724), in the course of which, by the way, an adverse criticism is gratuitously attributed to the editor of this Journal, after which the authors proceed to deal with a further modification proposed by C. N. Stillwell, of New York. Both of these methods are, however, condemned as giving indications that are too low, though the authors endorse a statement of Stillwell that the process of Squibb, used as he directs, will give results which are almost exactly comparable amongst themselves, a statement which they stigmatize somewhat sarcastically as "Squibb's law."

The next method criticized is one said to be known as the Hager-Jacobsen process, and to have been recommended by Professor Prescott to the Committee of Revision of the United States Pharmacopœia. Following this process carefully, and working on an opium known to contain 11·20 per cent. of morphine, Messrs. Teschemacher and Smith obtained only 9·05 per cent. of morphine, and they attribute the deficiency of 2·15 per cent. to solubility of the alkaloid and the large quantity of water used. The working of the process of the Austrian Pharmacopœia was found to be attended by still greater loss, and more or less similar results were obtained with other processes followed.

Messrs. Teschemacher and Smith then proceed to

discuss the process of the British Pharmacopœia, 1885, in the following paragraphs :—

"This process of the British Pharmacopœia of 1885 is, in our view, by far the most important to the dealers in opium in this kingdom of any of the processes for determining the morphia present in opium we have considered or met with. It comes to us claiming respect, and seemingly entitled to exact it. The British Pharmacopœia is stamped 'By Authority,' 'Pursuant to the Medical Act, 1858.' It has been compiled by three editors, who are professors to boot, seemingly with the guidance and sanction of physicians of rank and standing. Thus it may claim to possess legal authority also, and be appealed to, on any question which may arise connected with the subject of which it treats, and its authority accepted by a Court of Law as determining, and determining finally, any such question. Thus, whilst compelled to point out some two or three questionable directions in this opium process of the British Pharmacopœia, we have followed its directions when possible,—as in taking 1040 fluid grams of the filtrate, and only declining its somewhat rude apparatus for measuring these, as it did not admit of being used twice successfully, if ever.

"We have employed this method in six different trials, with the subjoined results, using an opium constantly giving us 11·20 per cent. of morphia.

No. 1	yielded	9·60	per cent.	of morphia.
2	,,	10·50	,,	,,
3	,,	9·60	,,	,,
4	,,	9·60	,,	,,
5	,,	9·40	,,	,,
6	,,	9·40	,,	,,

"Experiment 'No. 2, 10·50 per cent. of morphia,' is the only doubtful result. No approximation to this occurred in either of the four subsequent tests, and thus we incline to assign this one to some errors of analysis, and dismiss it from consideration as usual in such cases.

"The crushing conclusion remains that a process which ought to be trustworthy signally fails when put to the proof by probably the most practised hands in the kingdom. It has yielded 9·40 to 9·60 per cent. of morphia with an opium which has, over and over again, afforded us 11·20 per cent. Moreover, whilst we are very sure that our 11·20 per cent. is pure morphia, we have no such conviction, but rather grave doubts, whether the Pharmacopœia method yields, or is expected to yield, pure morphia. If so, whence that odd provision of a margin of '9½ to 10½ grains?'—*i.e.*, a difference of some 10 per cent. in the results, permitted, probably expected.

"We have not seen the Medical Act of 1858, but we should be amazed to find that such a matter as this opium process was an instruction therein, and, therefore, if it were not requisite, we are still more amazed to find that a triple editorial staff did not suffice to cancel an imperfect process and suppress it altogether. Here the Squibb law, that results may be obtained 'almost exactly comparable among themselves,' is again true, five tests yielding from 9·40 to 9·60 per cent. of morphia, so that a faulty method, involving grave sources of error, is adopted by authority.

"Our own experience with opium has long led us to distrust the use of lime, which the Pharmacopœia authorities have employed in both their editions. This use of lime is open to many objections, an obvious one being that as sal-ammoniac precipitates lime when added to such a solution as yielded by the Pharmacopœia process, and the precipitate is washed with distilled water, this water will dissolve the lime, which, in its turn, will dissolve the morphia, and thus be one cause of the large loss of morphia involved in the use of this process of the British Pharmacopœia."

Having discussed other methods Messrs. Teschemacher and Smith next describe the method at present used by them for the determination of morphine in opium as follows :—

"We now prefer to employ 200 grains of opium, if the sample permits,—

"1. To thoroughly exhaust this with warm distilled water.

"2. Then concentrate this watery extract to a thin syrup in a shallow dish, over a water bath, which we prefer should not boil.

"3. Transfer this thin syrup to a suitable flask, which permits the use of a soft cork, using a few drops of water successively, to wash out the dish. Add to the contents of the flask 50 fluid grains of alcohol, sp. gr., about 0·820, and about 600 fluid grains of ether. Mix gently, but thoroughly, and then add some 50 fluid grains of ammonia, sp. gr. 0·935.

"4. Shake the contents of the flask well to precipitate the alkaloids in arenaceous crystals, with occasional agitation during the ensuing eighteen hours.

"5. Transfer the contents of the flask to a vacuum filter, and permit all the adherent liquid to be drawn away, washing out the flask with our morphiated spirit, and continue its use till the liquid passes colourless. Now wash with morphiated water, till this also passes colourless.

"6. Now dry, slowly at first, finishing at 212° F. Transfer the dried substance to a mortar, reduce it to a very fine powder, and digest it thoroughly in benzene to dissolve the narcotine and such of the opium alkaloids, other than morphia, which may be present.

"7. Transfer this mixture to a vacuum filter, wash out the mortar carefully with benzene, which use to wash the powder thoroughly. This, then, will be morphia, free from other opium alkaloids and narcotine, but still containing colouring and possibly other organic matters to the extent of 3 to 10 per cent. Dry and weigh this powder.

"8. Now ascertain the percentage of crystallized morphia by titration of this powder with standard hydrochloric acid and litmus as the indicator, by weight. This acid is so made that 1000 grains by weight shall exactly neutralize 100 grains of pure morphia crystallized from water, washed with ether, and gently dried finally at 212° F."

"*For Morphiated Spirit.*—Digest a large excess of morphia in rectified spirit of 80 per cent., for several days, with frequent agitation. Filter for use.

"*For Morphiated Water.*—As above, substituting distilled water for spirit."

The authors conclude by remarking—

"In the *Pharmaceutical Journal* (vol. xii., p. 704) we find it stated, on the authority of Dr. Squibb, that 'For more than thirty years it has been unlawful for the United States Custom House examiners to allow any opium not containing at least 9 per cent. of morphia to pass into the country.' Thus the United States Custom House officials are able, at their will and pleasure, to pass or reject every case of opium imported. In the foregoing we have shown that, granting the capacity to examine opium to these officials, involving a huge admission which we could not grant in good faith, yet these officials have no method whereby they could determine whether or no an opium does contain 9 per cent. of morphia; so that they cannot fulfil their instructions, but simply act according to their will and pleasure.

"In illustration of the above, some friends of ours recently shipped ten cases of opium to New York, averaging 10·20 per cent. morphia. Of these ten cases six were rejected as containing less than 9 per cent. morphia. We hear, further, that these rejected ones yield from 7·40 to 7·98 per cent.; this second place of decimals, instead of 8 per cent., points to an accuracy which will, we fear, be for a long while the distinctive

characteristic of the New York Customs' analysts. If they be correct the happy consignee will secure four chests at 13½ per cent. morphia instead of 10·20 per cent.—a gain of 3·30 per cent., solely due to the lawful action of the Customs of the United States."

IODIDE OF ETHYL.*

BY DR. SQUIBB.

Ethyl-iodide is a substance well adapted to a few uses in the materia medica, and some of these uses appear to be important. But the occasions for employing it being rare, and the liquid being difficult to preserve in good condition for use, and when needed being generally found in a bad condition, or to have been badly made,—all these circumstances seem to have conspired to keep it in the background, comparatively inaccessible and forgotten. Thus it might be useful to try to devise some means of keeping it in a good condition, with a view to affording it in such condition.

It is a colourless, volatile, very heavy liquid, of an agreeable ethereal odour, composed of one molecule each of ethyl ($C_2H_5=29$) and of iodine ($I=126·6$). The s. g. at 15·6° C. compared with water at the same temperature is 1·9428—boiling point about 79° C. or 175° F. Mendelijeff gives the sp. gr. at 15° C., as 1·9309, but this is probably compared with water at 4° C. Andrews gives the boiling point as 71·3 C.

It is colourless only when it has not been exposed to light, as even a very slight exposure gives a reddish-brown tint from decomposition by which iodine is set free. But a very slight degree of decomposition gives a very considerable depth of tint, so that when the colour does not exceed a wine colour it may be disregarded in use. And even when deeper than this the free iodine which evaporates with the liquid is not in sufficient quantity to produce irritation. The product of the following process, to which the above given description applies, has a disagreeable alliaceous odour in slight degree, which is supposed to come from the presence of arsenic in the phosphorus—and no phosphorus is accessible that is free from arsenic. If the odour be from arsenic, however, the quantity is too small to be discovered by the ordinary tests.

The best process for preparing iodide of ethyl for medicinal uses seems to be that of Beilstein and Rieth, as quoted by Roscoe and Schorlemmer, vol. iii., pt. i., p. 347, from *Ann. Chem. Pharm.*, cxxvi., 250, very slightly modified as follows:—

	Parts or Grams.
Iodine, resublimed, of commerce . . .	1000
Alcohol, clean, sp. gr. ·814 to ·820 . .	500
Amorphous phosphorus	100.

Grams are used in this process, and the alcohol and phosphorus are weighed into a flask of about 2 litres capacity. The flask being set in a large basin of cold water, the iodine is added in portions of 100 grams at intervals of about fifteen minutes, the contents being well shaken round about ten minutes after each addition of iodine and again just before the succeeding addition. By this management the contents become very warm, but not very hot. When the iodine is all added the flask is loosely stoppered and set aside for twenty-four or forty-eight hours. The flask should be now managed and handled very cautiously, since from the great weight of the liquid the slightest touch against any hard object breaks it.

The flask is then fitted up for distillation in a salt-water or dilute glycerin bath, using a Liebig's condenser with glass tube, and distilled until the rate is reduced to slow dropping. The weight of the distillate is 1230 to 1240 grams. The residue in the flask may be thrown away or may be used for making phosphoric acid. The distillate is highly coloured by free iodine. It is transferred to a separator and shaken with a very diluted solution of soda until it is quite free from colour. This decoloration is usually accomplished by 30 c.c. of normal test solution of soda in 100 c.c. of distilled water: but if the decoloration be not complete 10 c.c. more of the test solution will complete it. The liquid is then separated from the washings into the cleaned and dried flask, and is then rectified in the same way that it was first distilled. The first 100 c.c. of distillate will contain most of the water that was dissolved, and will be cloudy from the presence of this. It is convenient to receive this fraction separately in a small flask filled to half-way up the neck. Then in about twelve hours' standing the water will separate and may be taken from the top by bibulous paper, and the clear liquid below it be added to the remainder of the rectified distillate. This first fraction of the distillate sometimes has a much more marked garlicky odour than the larger portion, and if so, it is poured into a capsule and heated slightly until it is freed from the excess of this odour, and this heating may entail a loss of 30 to 50 grams. When this loss is not necessary the total yield will be about 1120 to 1130 grams—or when the loss is necessary, about 1080 grams. The product should be at once put up in small vials, and for economy in dispensing for use these should not contain more than an ounce, because a portion of each vial will be spoiled before it is all used, even with good management. An ordinary half ounce vial, cork stopped, is the proper container for an avoirdupois ounce, and as this measures just 15 c.c., it may conveniently be put up by this measure. As a partial, but useful protection against discoloration by keeping—although it does not at all prevent the decomposition which causes the liquid to become colored, but merely saturates the iodine as it is set free—it is advisable to put upon the surface of the liquid in each ounce vial 5 c.c. of a solution of soda made by mixing 20 c.c. of normal test solution of soda with 80 c.c. of water. Without this, even with great care to exclude light, the ether will in a month or two become distinctly brown tinted, and in six months to a year will be of a pale wine colour. When not deeper than this it is entirely fit for use; and when much deeper it can be easily decolorized by shaking with a fresh portion of dilute soda solution.

It is very important to state that from beginning to end this process should be or rather must be conducted by artificial light of low intensity. In the putting together of the elements, and during the first distillation, the exclusion of light is not essential; but for the rectification and putting up, light should be excluded, and no daylight should get access to the vials until after they are wrapped in dark, thick paper. Even with such wrappers the vials should be kept in a cool, dark place.

When in use by nurses or patients the wrappers should be kept on, and be only loosened around the cork and the lip, and the vial should be kept in the dark.

It is used by inhalation only, and the best way to administer it is to drop the dose into a small wide mouth vial and inhale the vapour directly from the mouth of the vial through the nostrils, using the warmth of the hand around the vial to hasten the evaporation. Inhaling the dose from a handkerchief is a very wasteful and uncertain mode of administration, and although generally recommended it is not the best way nor a good way.

The dose to begin with is from 15 to 20 drops, but when indicated at all it should be pushed to some distinct effect before being abandoned, and then if useful the effective or useful quantity will be ascertained, and may be repeated several times a day.

Iodide of ethyl, under the name of hydriodic ether, seems to have been introduced to therapeutic use by Dr.

* From *Ephemeris*, June.

Huette in a paper published in the *Journal de Pharmacie* for October, 1850, and an abstract of this paper, and of another by M. Cap, is given in the *Amer. Journ. of Pharmacy*, 1851, vol. iii., or new series xvii., p. 154. In the *Medical Record*, 1880, vol. xvii., p. 688, is a paper by Dr. Robert M. Lawrence of Boston, on "The Therapeutic Value of Iodide of Ethyl," wherein may be found a good bibliography of the subject supplemented by Dr. Lawrence's experiences.

It is the easiest, most convenient and most rapid means known for saturating the organism with iodine. Iodine is found in the urine within a quarter of an hour after from fifteen to eighteen inhalations of the vapour, and continues to be so found for sixty hours (Huette). Hence as an adjunct to iodide of potassium when this is required in large quantities, as in syphiloma and other conditions of secondary and tertiary syphilis, it is well adapted to be useful. It does not weaken the digestive organs nor impair the appetite, as large doses of iodide of potassium often do when they have to be continued to saturation, but has a rather stimulant, tonic effect (Huette and Germain Sée). With such considerations as guides to its general use it has been successfully applied in many neuroses of the respiratory and circulatory apparatus—to chronic capillary bronchitis—to many forms of asthma, and to the temporary relief of dyspnœa from whatever cause.

Those who use it should remember that it is about four-fifths iodine, and that the inspiration of fifteen to twenty drops from a wide mouth vial will probably result in the absorption of say one-fourth of it—or four to five drops, weighing 6 to 7 grains. Four-fifths of this, or say 4 to 5 grains, would be iodine. Any such dose of free iodine would be so irritant as to be poisonous, the usual dose of free iodine, as in the compound solution (Lugol's solution), being $\frac{1}{4}$ to $\frac{1}{2}$ a grain. Iodide of potassium, however, is over three-fourths iodine, and 10 grains of this salt would therefore represent about 7·5 grains of iodine.

As iodine is much less irritant when combined with a base than when free, and is equally effective, it is generally used in combination with some base. Then as the base ethyl of the salt iodide of ethyl is less irritant (or rather is not at all irritant under any known circumstances) than the base potassium of the salt iodide of potassium, and as iodide of ethyl is much more easily resolved into its elements than iodide of potassium, it follows that the former salt has at least these advantages over the latter in rational therapeutic uses.

A PROXIMATE ANALYSIS OF GRINDELIA ROBUSTA.*

BY JOHN L. FISCHER, PH. G.

Four ounces of *Grindelia robusta* was powdered and dried, the loss in moisture being 11·08 per cent. The powdered drug was then exhausted with petroleum spirit at a boiling point of 45° C; this extracted 8·50 per cent. of fixed oil. No volatile oil was found in the petroleum extract; the fixed oil readily saponified with caustic potash and soda. The drug was next dried, reweighed, and exhausted with absolute ether. This extracted 10·05 per cent. of oleoresin, with some chlorophyll; this oleoresin upon distillation yielded a volatile oil. Two per cent. of the oleoresin was soluble in water. This soluble portion of oleoresin was filtered; the filtrate had an acid reaction. The filtrate was neutralized with bicarbonate potash and then decomposed with dilute sulphuric acid, and extracted with absolute ether. The ether solution had an acid reaction, and when it had evaporated, left a group of crystals, having the form of elongated rhombic prisms.

The oleoresin, after being treated with water, was treated with warm water and dilute sulphuric acid, and filtered; the filtrate was made alkaline with caustic potash and extracted with absolute ether. This ether extract had an alkaline reaction, and gave precipitates with the alkaloidal reagents.

To absolute alcohol the drug yielded 6 per cent. of solid matter: 2·15 per cent. of this solid matter was soluble in water; the aqueous solution also had an acid reaction. This aqueous soluble portion of the alcoholic extract was next minutely examined, and was found to contain an acid crystalline principle identical with the one found in the ether extract. I shall name this acid robustic acid; it is soluble in ether, alcohol and water, but insoluble in petroleum spirit and chloroform. This acid readily displaces carbonic acid from the alkaline carbonates. The oleoresin, after being treated with water, was treated the same as oleoresin of the ether extract after the acid had been removed, and gave the same result, namely, the presence of the alkaloid. The resin that was extracted by ether and alcohol was soluble in caustic potash.

The original drug was next exhausted with distilled water; this extracted 13·50 per cent. of solid matter. When this solid matter was redissolved in distilled water, and this aqueous solution made alkaline, and then extracted with ether, an alkaline principle was found identical with the one found in the ether and alcoholic extract. I shall name this alkaloid "grindeline." It had an alkaline reaction, neutralized acids to form salts, the sulphate crystallizing in groups of acicular prisms.

It is bitter, soluble in ether, alcohol and water, and is precipitated by the following alkaloidal reagents: Tannic acid, double iodide of potash and mercury, picric acid, bichromate of potash, triodide of potash (an aqueous solution of iodine in iodide of potassium), terchloride of platinum and chloride of gold.

To a 2 per cent. solution of hydrochloric acid the drug gave 2·01 per cent. of salts. Upon bleaching the final residue, washing and drying, 47 per cent. of cellulose was obtained. To obtain the pure alkaloid, I have found the following process to give the best results: Exhaust two pounds of grindelia robusta in moderately fine powder with diluted alcohol acidulated with sulphuric acid. After the drug has been exhausted, put the percolate on a water bath and allow it to remain until the alcohol has been driven off, keeping the temperature as low as possible, then add a solution of caustic potash until alkaline; finally extract the liquid with ether and allow the ether to evaporate spontaneously. After the evaporation of the ether, and if the process has been carried out as given above, crystals of the pure alkaloid may be seen.

The following shows the amount of the most important constituents:

Moisture		11·08
Fixed oil, Chlorophyll	Petroleum extract	8·50
Oleoresin, Chlorophyll, The acid, The alkaloid	Ether extract	10·05
The acid, The alkaloid, Oleoresin, Chlorophyll, Extractive matter	Alcohol extract	6·00
Extractive matter, Pectine, Sugar, The alkaloid, The acid	Water extract	13·05
Extractive matter, Salts	Dilute acid solution	2·02
Cellulose		47

* Reprinted from the *Pharmaceutical Era*, June.

BAHAMA SPONGES.*

BY F. STEARNS.

(*Concluded from page* 6.)

The sponges, on the arrival of the vessel at Nassau, are taken possession of by the owner of the boat, who with the men unloads them and spreads them out on fresh palm leaves under the open sided sponge warehouses where the sales are daily made. They are graded by species only, not sizes, and counted. On each pile is placed a board with initials of owner, and the owner hands the Secretary of the Sponge Exchange a pencilled list of his lots and the numbers in each.

This done, the buyers—or brokers as they are called—a small body of merchants acting generally for the Jewish sponge merchants of New York, London, and Paris—go through or over the lots, examine them and make written tenders or bids in lumps for the lots wanted. These tenders are collected by the Secretary, and at 12 o'clock noon he declares the highest bid for each lot, and the name of the bidder. The sale is absolute and for cash. The sponges are then hauled away to the warehouse of the broker by donkey carts with huge open crates on them, and by two o'clock each day the Sponge Exchange is empty. No sponges are marketed on Saturday.

The broker at his warehouse sorts, grades, cleans, trims, dries, bales, and ships the sponges. They are graded into nearly sixty sizes and qualities, about as follows, with which I give the prices, now obtaining free on board at Nassau.

Sheep's Wool Sponge is divided into three grades and six sizes.

No. 1.—Medium is 6 to 8 inches in diameter and is the first. Choice brings 1 dol. 30 cents to 1 dol. 35 cents per pound.

No. 1.—Large and Medium Large is 10 to 15 inches in diameter and brings 1 dol. 15 cents to 1 dol. 25 cents per pound.

No. 1.—Medium Small runs 12 to 15 pieces to the pound and brings 85 to 90 cents per pound.

No. 1.—Small runs about 20 pieces to the pound and brings 50 to 60 cents per pound.

No. 2.—Not graded, but consists of different sizes put together, each having some defect, generally full of large holes or the central orifice penetrating the entire sponge. Also such as are not substantial or strong or cut pieces, etc., 65 to 70 cents per pound.

No. 3.—Very imperfect of all sizes 20 to 30 cents per pound.

Velvet Sponge.—Two kinds, one finer grade from the island of Abaco, the other from the Cays, very soft and yet strong, in great demand in Europe. (Sizes of Velvet grade as in Sheep's Wool.)

No. 1.—Medium Abaco Velvet 85 to 90 cents.

No. 1.—Medium Small Abaco Velvet 60 cents per pound.

No. 1.—Small Abaco Velvet 45 cents per pound.

No. 2.—Abaco Velvet 50 cents per pound.

No. 1.—Cay Velvet assorted sizes in very large demand, runs rather small in size, 50 cents per pound.

No. 2.—Cay Velvet 30 cents per pound.

No. 3.—Cay Velvet 15 cents.

Reef Sponge is sold assorted into three sizes:

No. 1.—Small 2½ by 3 inches in diameter; Medium 3 by 3½ inches in diameter; Large 4 by 5 inches in diameter. All sold at 70 to 75 cents per pound.

No. 2.—Mixed inferior, 30 to 35 cents per pound.

Grass Sponge graded as to size as in Sheep's Wool.

No. 1.—Medium Small sold at 35 to 40 cents per pound.

No. 1.—Small at 25 cents per pound.

No. 2.—Assorted, imperfect at 20 cents per pound.

Yellow Sponge about the same grading sizes and prices as Grass Sponge.

Glove Sponge—No. 1.—One size 6 by 10 inches at 40 cents per pound.

No. 2.—Same size but defective at 20 cents per pound.

Hard Head graded in same sizes as Reef but sold all at one price, 50 cents per pound.

The sponges are hard pressed into bales of 50 to 70, or 70 to 120 pounds, as required by foreign buyers, sometimes even in smaller bales 20 to 30 pounds.

The exports average about 300,000 dols. per year, one year with another.

This industry is about at a standstill, neither increasing nor declining. Want of men it is thought would interfere with an increase of the industry to any great extent.

Some banks are much exhausted. Sometimes new sponge fields are found. One discovery of a bank of Sheep Wool sponge, a few years ago, so glutted the markets of the world for a time as to materially break the value of that sort.

Attempts to plant the finer species of the Adriatic and the Levant have failed. Such grow in deep waters. The sponge banks of Andros, over which I cruised, are the largest in the world and the most prolific.

Division of earnings between the outfitter and crew is as follows: the crew are paid by share. The outfitter advances to the crew before the voyage, to each about five dollars in money or in stores, say three dollars for the man and two for his family. On the arrival of the cargo after a four to six weeks' voyage, the proceeds may bring only fifty dollars, though a good cargo will bring 150 to 200 dollars, an extra good one 300 to 500 dollars.

Out of this comes the commissions of the selling brokers (five per cent.), then out of the balance the cost of food and stores furnished for the support of the men during the voyage. Of the balance the vessel has one third (⅓), the rest is then divided into equal shares. The captain has two shares, the mate 1½, the sponge hookers 1½, the cook and the others of the crew each one, and the small boats (all owned by the outfitter) each one share.

It is found that the average earnings of the crew is from seven to eight dollars each, out of which comes his food or advance pay, so that after a voyage of hard work, bread and water, lasting four to six weeks, he is handed a net result of maybe a dollar, or at most three dollars. If the weather is bad and the water rolly, no sponges of any amount are secured, and the vessel will not earn value of its stores, and then both crew and owner are out. The crew gets its food in that case only, and the shortage is the loss of the outfitter. The vessels are never insured, a wreck is at the risk of the owner.

This is the dark side of the picture, hard and often dangerous work for from 1·00 to 2·00 per week, and that mostly consumed for food.

There is one universal voice among the sponge fishers against the poor pay in this calling, while the outfitters and brokers state that a net of five per cent. is all that the business yields. The Nassau Sponge Exchange is a close corporation, the capital stock being £600, and this organization transacts all the business of the industry.

The supply of Sheeps' Wool and Velvet is hardly equal to the demand, but that of the other and coarser sorts is in excess of demand, and the stocks of the world are large.

Most of these stores and warehouses are on Bay Street, Nassau.

The commercial and other species do not grow in isolated beds each by itself, but many species grow in the same neighbourhood. Nor are they in beds or masses, but singly or scattered along within a few feet or yards of each other.

* From the *Pharmaceutical Era*, June.

Every morning may be seen, at the sponge wharf in Nassau, from six to twenty sponge vessels just arrived with cargo, the men, a noisy crowd, chaffing, gossiping, and visiting with a lot of relatives or sweethearts who come down to see the incomers whose luck and earnings they will share.

In the cargo the smaller sponges are strung from four to ten on a strip of silver leafed palm-leaf, and this is called a *bead* (from probably its resemblance to a necklace). These beads match in value the larger rough sponges.

On some of the outlying islands reef sponging is done from small sailboats, the owners of which sell to some near trader or to the larger vessels.

The spongers accuse the brokers or the stock exchange of combining to keep prices down, and that the bidding is so managed that the poor ignorant black man can not tell anything how the prices go and what is realized, and that he has to take his pittance unquestioning.

On the other side the brokers state the spongers steal both time and sponges, that the sale is regulated by law, that the profits are very small from great competition, etc., etc.

One may hear both sides and even then reserve his opinion, but I think I had rather be an outfitter than a sponge-fisherman. For facts relating to grading and the prices of sponge I am indebted to Mr. S. P. Saunders of the Nassau Sponge Exchange.

PREPARATION OF HYDRIODIC (AND, INCIDENTALLY, PHOSPHORIC) ACID.*

Professor Lothar Meyer has recently published a paper (in *Berichte d. D. Chem. Ges.*, 1880, 3,381) on the preparation of gaseous hydriodic acid, which contains valuable hints for those who desire to prepare this acid for medicinal or technical purposes.

Professor Meyer points out that the drawbacks inherent in all hitherto used methods of preparing pure hydriodic acid may be avoided by a very slight improvement, consisting only in the precaution to have *at all times* an excess of iodine present. The usual methods direct to add iodine to an excess of phosphorus. This is the cause of the generation of phosphoretted hydrogen and phosphonium iodide. [Phosphonium is the hypothetical group PH_4, corresponding to ammonium NH_4. Phosphoretted hydrogen, or phosphine, PH_3, is capable of combining with haloid acids: $PH_3 + HCl = PH_4Cl$, which is phosphonium chloride, PH_4I phosphonium iodide, etc.]. The excess of iodine is so decidedly necessary that it is even faulty to remove any free iodine which may have been carried over by the gas with moistened phosphorus, as this may be the cause of accidents.

The reaction which takes place between phosphorus and iodine :—

P	+	5 I	+	$4 H_2O$	=	H_3PO_4	+	5 HI
Phosphorus.		Iodine.		Water.		Phosphoric acid.		Hydriodic acid

requires for every hundred parts of iodine nearly 5 parts of phosphorus and 12 parts of water, provided a very concentrated *hydriodic acid* is required. These proportions should be maintained, except that about 20 parts of water are preferably taken. The process is conducted in the following manner :—

The 100 parts of iodine are placed in a tubulated retort, the neck of which is turned upward, and about 10 parts of water are poured in. The other 10 parts of water are mixed to a thin magma with 5 parts of red phosphorus, and this is transferred to a funnel, the neck of which is stoppered, not by a faucet, but by a long glass rod ground into the lower end of the funnel. This glass rod, and particularly its lower ground end, should not be too thick, as the magma of phosphorus would otherwise not easily pass by it. The funnel having been fitted in the tubulure of the retort, and the receiver, containing a suitable quantity of water, having been connected with the retort, the glass rod is *very carefully* drawn up so that *one* drop (no more) of the phosphorus magma may fall upon the iodine. This stage is the only one where *caution* is necessary. Should the operator, induced by the apparent failure of any reaction or its feeble progress, allow more phosphorus to reach the iodine in the beginning, the action would become uncontrollable and an explosion would generally result.

[*Note by Ed. Am. Drugg.*—We find, on trying this method on a small scale, that it is not always easy to restrict the quantity of phosphorus paste in the beginning *to just one drop*, if the funnel is charged with the whole of the magma, as above directed. The safest plan is to put into the funnel at first only so much of the magma that a raising of the glass rod cannot allow more than *one* drop to fall in. Afterwards the funnel may gradually be filled with the remainder.]

If the phosphorus is added at first quite slowly, and the reaction is allowed to moderate before adding more, the time will soon arrive when larger quantities of the phosphorus may be added at once, so that the whole operation may be completed within about fifteen minutes (when 100 gms. of iodine are taken in operation). The whole reaction then takes place quietly and requires no heat until near the end. Any free iodine mechanically carried over by the hydriodic acid is almost wholly condensed in the neck of the retort. In order to prevent its passing over as far as possible, it is advisable to connect the retort with the condenser by means of a long, moderately wide glass tube, directed upwards, and to pass the current of gas first through a U-tube containing a little water. The best form of receiver is a pair of Woulff's bottles, connected by a syphon. In the first of these, the delivery tube ends immediately below the cork, the gas being absorbed by the water contained in the bottle with avidity. If desired or thought advisable, several of such bottles may be connected by tubes ending below the corks. When the reaction has almost ceased, a gentle heat is applied to the retort, whereby also some aqueous vapour is driven over which causes the iodine adhering to the walls to return to the retort. Should the iodine tint [of the contents of the retort] not disappear even after heating for some time, a *very small* quantity of iodine together with a few drops of water may be introduced. But care must be taken not to apply heat in presence of an *excess* of phosphorus, as this would cause the evolution of phosphonium iodide.

If the operation is to be repeated a short time afterwards, the residue may be left in the retort, and new quantities of iodine and phosphorus added. But if it is desired to utilize the ingredients of one operation to the utmost, the neck of the retort is directed downwards (after all the hydriodic acid has come over), a receiver with well-cooled condenser attached and heat applied, which causes the aqueous hydriodic acid remaining in the retort to distil over. If any free phosphorus should still have been present, a little iodine is added, or better, the liquid is diluted and filtered off from the phosphorus before being distilled. Finally there remains in the retort colourless, syrupy phosphoric acid.

Professor Meyer obtained from 100 gm. iodine, 5 gm. phosphorus, and 35 gm. water, altogether 95 gm. of hydriodic acid (instead of the theoretical quantity, 100·8 gm.). Of this amount 57·5 gm. came over directly as gas, and the balance (37·5) was distilled over in aqueous solution. When only 20 gm. of water were used, he obtained 74·4 gm. as gas, and 23·7 gm. by distillation, together 98·1 gm. The amount of water to be introduced in the receiver should be such that the resulting product will have the desired strength.

* From the *American Druggist*, April.

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PROTECTION—AND PROTECTION.

IN its essence, protection, of whatever kind, is selfish, being either designed for individual self-preservation, or for the preservation of the class, larger or smaller, of which the individual constitutes a unit. Selfishness, however, is not altogether blameworthy. Its vicious side has been so decried that its virtue has become more or less entirely masked, and it is fashionable to protest against selfishness *in toto*. Unquestionably it is evil when self becomes the chief and only care, but unless there were some devotion to one's self and class, resulting in an increased measure of safety, it would be impossible to help others effectually. Nature's primary lesson is, "Protect thyself." This she reiterates and enforces at all seasons, for, as a teacher, there is none so persistent and dogmatic as she. We find, too, that even with our present high pitch of civilization, which enables us temporarily to dodge and, as it were, apparently evade the inexorable results of infringements of Nature's rules, he who neglects this precept must sooner or later, in whole or in part, become an unknown quantity. Of course, no man fails to protect himself somewhat; but if his armour be not perfect evil will follow, and be harmful to him in proportion to the value of the place unprotected in the economy of his being. If he be careless concerning clothing, food, and general hygiene, he exposes himself to the assaults of disease with its attendant, death; whilst the attempt to ignore the necessity of procuring the essentials of life brings extinction in another shape. So much for the general issue. Coming to particulars we note that, other things being equal, that workman is most assured of a decent livelihood who is most skilful; that the business man measures his success in proportion to his mastery of business details, and the professional man survives competition in his more exclusive struggle according to the extent to which he has developed his intellectual faculties. So we arrive at the position of the pharmacist (worker, business and professional man all in one), who most certainly needs protection, and that of no mean order. It may be thought that he is fully conscious of his need; but we doubt if, with the majority of his class, it is felt but as a vague, shadowy something which they fail to realize in a true light. It is true they cry for assistance when they fall upon evil days, but too often their demand is for an impossible protection, and their suggestions, when any are made, are deficient in practicability. For, too often they seek to be delivered from the results of their own neglect; they would reap where they have not sown; they who have not rightly helped themselves ask others to help them. We venture to suggest that what is thus sought is not true protection, which benefits those protected without harming others, but rather of that questionable kind which confers immediate benefit upon the few with manifest injustice to the many. Such protection is not likely to be granted in this England of ours at so late a time of day. The necessity of seeking protection, when truly realized, will also suggest its nature, and it ought to be so realized before the shoe pinches. The wise man, instead of waiting until he is in sorry plight, will always labour conscientiously to make his future secure by unremitting anxiety to keep in the van of progress.

It should be evident to all by this time what our opinion in regard to this momentous question is. We advocate the strengthening of the pharmacist's naturally strong position by all justifiable means at his command, and that this should be done systematically from the beginning of his career; in fact, that he should surround himself with the means of protection long before the least occasion for special protection actually arises, and that he should ever be careful to keep his defences in safe repair. The tyro, after a sound scholastic training, should make himself intimately acquainted with the rudiments of the various sciences connected with his art whilst busily engaged in mastering the technical details of the business in his everyday round. Pupilage over, he should increase his intimacy with the working of the different keys to knowledge at his command, so as to make himself as near as may be, for the time being, a perfect pharmacist, able and willing to serve the public faithfully in that capacity, whilst benefiting everyone with whom he comes in contact in an equal degree with himself. Afterwards, and until the close of his career, his single aim, as a pharmacist, should be to preserve and add to the reputation already gained by working constantly (as hard as ever in his younger days) to keep himself abreast of his age, fully informed of all improvements, fit and able to weigh carefully all new suggestions, and appreciative of every advance, however slight, in any of the kindred arts and sciences. The fulfilment of this scheme by men of fair business aptitude would ensure protection as perfect and honest as could possibly be obtained. That it is practicable has been and is being proved by many worthy sons of

pharmacy. In that future, which is anticipated with dread by so many, we venture to predict that it will be found by the generality of our profession to be the best and only real method of protection, both for themselves and for the public.

With the feelings of those who view with alarm and regret the possible extinction of the unfit in our body, who will not or cannot adapt themselves to modern requirements, we cannot profess to have great degree of sympathy, so far as pharmaceutical interests are concerned. Their loss will prove the general good, and it will be altogether the result of their own want of foresight. Hence we deprecate the introduction of legislative interference as a check to this thinning out process. The clamours for the restricting in that way the sale of certain trade commodities to the chemist and druggist, whilst he remains at liberty to infringe upon the province of other tradesmen, are both unreasonable and contemptible in their meanness. Besides which, it must be remembered that the public will hold that its safety is better consulted by the present free competition which compels the pharmacist, if he would make a monopoly for himself, to seek it on the basis of his special qualifications, and to secure confidence by offering always and only the best of everything, with a personal guarantee. This necessity, too, enables him to set at nought the attentions of public analysts and gives him a positive advantage over other dealers whose training and business necessities make them absolutely dependent upon the good faith of those from whom they purchase. It is well known that the best price will not always procure the best article in the drug market, and this is the unqualified dealer's weak spot. Even if the pharmacist be compelled to sell at store prices he will ultimately reap the benefit of this distinction between his position and that of outsiders. There will be no drawback either, for self-help compensates for its benefits in the process of working for them, whilst outside help must be paid for, sooner or later, more or less directly. We may see how state protected pharmacy abroad labours under conditions the reverse of pleasant from a British point of view. Grandmotherly legislation, minute official regulations, and the subversal of individual rights for the presumed public good, do not commend themselves to us as either workable or efficient, the restraints are too irksome to be compensated by the results. And yet some such payment would most inevitably and rightly be enforced were any monopoly granted us such as extremists desire.

Our attention has been called by Mr. Joseph Ince to the desirability, in the interests of Pharmacy, that British dispensers should unite in adopting a uniform weight for pills, the size of which, owing to the dose, is necessarily small, while the excipient is left to the discretion of the dispenser. For example, opium is ordered in 1 grain doses; the acetate of morphia in doses ranging between half and the eighth of a grain. The whole series of potent remedies will serve as further illustration. In most cases of this kind the pharmacist has no guide as to the size of the pill other than the practice of his own establishment. The result is to the disadvantage of some dispensers, since the historic house is always judged correct; and to the embarrassment of the patient, who cannot understand the reason for the discrepancy. In the Practical Pharmacy class Mr. Ince has adopted the continental plan of adding so much excipient as may be sufficient to make a 2 grain pill, bearing in mind that a very small globule is difficult to swallow. As a new session will open in October, we should be glad to know what is the general opinion on this subject, and would ask to be favoured with the views of practical dispensers. It is most desirable that custom in this respect should be regulated, and that an understanding should be come to in this branch of the dispensing art.

* * *

On Monday last a meeting of the chemists and druggists of Newcastle and district, convoked by by Mr. B. S. Proctor to consider the advisability of inviting the British Pharmaceutical Conference to meet in that town next year, was held in the Durham College of Science. After an explanation from Mr. Proctor, it was unanimously resolved to offer the invitation, and Messrs. Martin and Harrison were appointed a deputation to attend the Conference at Bath and urge its acceptance. A Committee was also appointed to make the necessary arrangements, with Mr. Martin as Chairman, Mr. Proctor as Treasurer, and Mr. T. M. Clague as Secretary, and it was announced that liberal support had been already promised to the entertainment fund. The fact may be recalled that the British Pharmaceutical Conference was originated in Newcastle-on-Tyne in 1863. If, therefore, the invitation be accepted, the Conference will revisit its birthplace after an interval of twenty-six years.

* * *

We are informed that an appeal has been entered by the defendant against the decision of Sheriff Birnie in the case of the Pharmaceutical Society *v.* Wright, reported in last week's Journal.

* * *

In a communication to *Nature*, in February last, Professor Rücker called attention to the practice prevalent among biologists, and botanists especially, of using the word "micromillimetre" as equivalent to the "one-thousandth of a millimetre," notwithstanding that the British Association Committee for the selection and Nomenclature of Dynamical and Electrical Units had in its report laid down the rule that the prefixes "mega" and "micro" should be employed "for multiplication and division by one million." Of course the term "micromillimetre" was in use among microscopists in the sense of one-thousandth of a millimetre long before the British Association Committee formulated its system of nomenclature; but, on the other hand, it is now used by physicists as a unit to express molecular magnitude, in the sense of one-millionth of a millimetre. The subject has been under the consideration of the Council and Fellows of the Royal Microscopical Society, who have recognized the force of Professor Rücker's objection by directing the editors of the Journal of the Society to discontinue the use of the term "micromillimetre" as equivalent to one-thousandth of a millimetre, and to substitute for it the word "mikron," which has also been used in that sense for a long time. In future, therefore, the thousandth of a millimetre will be called a "micron," and denoted by μ, while the millionth of a millimetre will be called a micromillimetre, and denoted by $\mu\mu$.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

July 10, 11, 12, 13, 17, 18 *and* 19, 1888.

Present on each day—Mr. Carteighe, President; Mr. Bottle, Vice-President; Messrs. Barnes, Blunt, Bowen, Corder, Druce, Fletcher, Gale, Gerrard, Greenish, Ransom, Symons, Tanner, Taylor and Thresh.

Dr. Greenhow was present on the 10th and 13th on behalf of the Privy Council.

MAJOR EXAMINATION.

10*th.*—*Eight* candidates were examined. *Two* failed. The undermentioned *six* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Beck, John Wilson .....Morecambe.
Carter, Benjamin .....Falmouth.
Crook, George .....Southport.
Doble, Henry Tregellas .....London.
Evans, Edgar Michael .....Cardiff.
Heaton, Simon Wood.....Leeds.

11*th.*—*Six* candidates were examined. *Three* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Evans, John .....Neyland.
Lucas, Edward William.....Ashbourne.
Morris, David .....Kidwelly.

17*th.*—*Seven* candidates were examined. *Five* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Salter, William Appleton .....Scarborough.
Want, William Phillip .....Lee.

18*th.*—*Seven* candidates were examined. *Three* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Davis, Henry Baker .....Swansea.
Long, Alex. John Temlett.....Bristol.
Vallance, Arthur Clayton .....Mansfield.
Wright, John .....Macclesfield.

MINOR EXAMINATION.

10*th.*—*Twenty-four* candidates were examined. *Seventeen* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Arden, Lawrence.....Bourne.
Ayris, Harry Charles .....Nottingham.
Bell, John Henry.....Windsor.
Bewers, Frederick John.....Lexden.
Bice, James .....St. Ewe.
Blott, Hugh Russell .....Bristol.
Boyes, William Jerome .....Malton.

11*th.*—*Twenty-eight* candidates were examined. *Twenty* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Briggs, Thomas .....Halifax.
Brown, Lincoln .....York.
Burnett, George .....Great Broughton.
Carman, Frederick Henry .....Lowestoft.
Cox, Herbert Victor .....Southampton.
Douglas, James Wellesley.....London.
Down, Frank Walter .....Sittingbourne.
Dring, Henry .....Hingham.

12*th.*—*Thirty* candidates were examined. *Eighteen* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Cox, William Francis.....Hipperholme.
Dyson, Archibald .....London.
Eynon, Charles James .....Leamington.
Filtness, Charles.....Ramsgate.
Fryer, Charles John .....Warwick.
Glover, Thomas John.....Cambridge.
Goold, Bruce.....Cardiff.
Griffith, William .....London.
Hall, Allen Joseph .....Coventry.
Hathaway, Fredk. Henry Wm. Lydney.
Hayton, Thomas Rebanks.....Plymouth.
Henley, George .....Lyme Regis.

13*th.*—*Thirty-one* candidates were examined. *Twenty-three* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Hitchman, Walter .....Kettering.
Horsley, Edward Smallbrook .Manordeilo.
Inman, Thomas Leonard .....Batley.
Jones, James .....Liverpool.
Knaggs, Chas. Marshall Robert. Upleatham.
McKenzie, James .....Perth.
Mason, Edgar .....York.
Moody, William Morton.....Salisbury.

17*th.*—*Twenty-eight* candidates were examined. *Ten* failed. The undermentioned *eighteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Atkinson, Leonard Joseph ...Greenwich.
Bromwich, Thomas.....Dudley.
Cain, Henry.....London.
Holt, Herbert Collins.....Bowdon.
Jones, Joshua .....Newcastle Emlyn.
Lewis, Richard George .....Carmarthen.
Longdin, Thomas William ...Wakefield.
Mossop, Henry.....Whitehaven.
Norton, Edward Thomas .....Stow-on-the-Wold.
Northwood, Herbert George...Leytonstone.
Ogle, John Henry .....London.
Ough, Lewis.....Plymouth.
Parkinson, William Armor ...Preston.
Patchett, John.....Halifax.
Pepperdine, Harry .....Peterborough.
Pring, Charles Herbert .....Bristol.
Ratcliffe, Samuel..... .....Southport.
Reid, Charles Stewart .....Aberdeen.

18*th.*—*Twenty-six* candidates were examined. *Eighteen* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Marsden, Edward Geo. Leece..Preston.
Masters, Henry .....Buxton.
Parry, John .....London.
Phillips, Wilfred Charles .....Stevenage.
Smart, Thomas Willis .....Reading.
Stuart, William .....Preston.
Sturton, John Gilbert.....Peterborough.
Tharratt, George Row .....Louth.

19*th.*—*Twenty-nine* candidates were examined. *Nineteen* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Harry, Samuel Rhys .....Swansea.
Rowe, Frank.....Ilfracombe.
Smith, Charles Bond .....Potton.
Turnbull, Henry John .....Darlington.
Turner, William Henry .....Worksop.
Walker, Francis .....Everton.
Watt, James.....Haverfordwest.
Westhead, William.....Stafford.
Willows, Herbert George .....Doncaster.
Yates, George Danson .....Preston.

Proceedings of Societies in London.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee of the Conference was held on Wednesday last, July 18, at 17, Bloomsbury Square. Present: Professor Attfield, F.R.S., in the chair, Messrs. Umney, Plowman and Martindale; and Mr. Naylor and Dr. Thresh, Hon. Gen. Secs.

The Hon. Secs. reported that in accordance with the resolution of a previous meeting the Sub-Committee had decided to present the books from the Bell and Hill's fund to the Royal Literary and Scientific Society, Bath, subject to the condition that the works should be at all reasonable times accessible to the pharmacists of the city. The Society had accepted the books with this condition, and had generously offered all the privileges of membership of the Institute to the members of the Conference during their stay in Bath.

Mr. Wilson (of Messrs. Commans and Wilson) was elected auditor in conjunction with Mr. Wilkinson, of Manchester, for the present year.

Fourteen gentlemen were nominated for membership of the Conference, and duly elected.

Dr. Thresh read a letter from Mr. Martin, of Newcastle, announcing that a meeting had been held and a Committee formed to invite the Conference to visit Newcastle next year. Mr. Martin is chairman of the committee, Mr. Clague, secretary, Mr. Barnard S. Proctor, F.I.C., treasurer. The Chairman and Mr. Harrison, of Sunderland, were appointed a deputation to attend the meeting at Bath to give expression to the resolution inviting the Conference.

ROYAL INSTITUTION OF GREAT BRITAIN.

Poisons and Poisoning.*

BY C. MEYMOTT TIDY, M.B., M.S., M.R.I.

Professor of Chemistry and of Forensic Medicine at the London Hospital, etc.

Toxicology is the science of "poisons and poisoning." How comes "toxicology" to mean "the science of poisons"? The Greek word τόξον (derived perhaps from τυγχάνω) signified primarily that specially oriental weapon which we call "a bow." In the very earliest authors, however, it included within its meaning "the arrow shot from the bow."

In the first century A.D., in the reign of Nero (a poisoner and a cremationist), Dioscorides, a Greek writer on materia medica, uses the expression τὸ τοξικόν to signify "the poison *for smearing arrows with.*" Thus by giving an enlarged sense to the word—for words ever strive to keep pace, if possible, with scientific progress—we get our modern and significant expression "Toxicology," the science of poisons and poisoning.

And there, in that little piece of philology (τόξον and τοξικόν—a bow and a poison), you have not only the derivation of the word, but the early history of my subject.

A certain grim historical interest gathers around the story of poisons and poisoning. It is a history worth studying, for poisons have played their part in history.

The "subtil serpent" taught men the power of a poisoned fang. History presents poisoning in its *first* aspect in a far less repulsive form than it has assumed in latter days—(for a world may grow wiser and wickeder withal). Poison was in the first instance a simple instrument of "open warfare." For this purpose our savage ancestors tipped their arrows with poison in order that they might inflict certain death on a hostile foe. It can scarcely be questioned that the poison of the snake was the first material employed for this object. The use of vegetable extracts (such as *curarine*, the active principle of which is strychnine, and is employed at the present time by certain uncivilized communities) belongs to a later period.

* Read at a Weekly Evening Meeting, Friday, March 2.

And so the first use of poison was for an "open fight." It was reserved for later times to mix the cup of kinship with a treacherous, diabolical venom!

"An open fight!" Is the suggestion (think you) too wild, supposing "war chemists" with their powders, their gun-cotton, and their explosives never to have been invented, that nations would have turned for their "*instrumenta belli*" to toxicologists and their poisons. I claim, however (notwithstanding that in this we missed our chance), no more for my subject than its due, if I attempt to localise the very cradle-room of science as the laboratory of the toxicological worker.

Besides snake-poison, the use of animal fluids, either alone or mixed with snake-poison, with which to charge arrows, is pre-historic. Thus in old Greek legend we read how Hercules dipped his arrows in the gall of the Lernæan Hydra to render the wounds they inflicted incurable and mortal, and how at last Hercules himself was poisoned by his wife's present, the tunic of the Centaur Nessus stained with his poisonous blood, which she vainly hoped might restore her husband's affection, but which only procured for him the frightful agonies and tortures of which he died.

The use of putrid blood as a poisonous agent and the admixture of the snake-poison with blood constitutes a curious history, when regarded in connection with our present views on septicæmia. The toxic activity of putrid animal fluids seems to have been recognized in very early times. And I suppose these early observations on the effects of putrid blood explain the view almost universally adopted, that blood itself was a poison. Thus the deaths of Psammenitus, king of Egypt (as recorded by Herodotus), and of Themistocles (as recorded by Plutarch), were said to have been effected by the administration of bullock's blood. Even Blumenbach, so lately as the middle of the last century, persuaded one of his class (by way of settling the question) to drink seven ounces of warm bullock's blood. The young man (good as were his intentions) did not die a martyr to science.

The history of poisons and poisoning, the contents of the first chapter of which I have thus briefly indicated (viz., the toxicity of the snake-poison and of blood), down to the final chapter, which commences with the properties and reactions of arsenic, forms a tempting subject for my lecture to-night. The histories of Circe and Medea—of Livia Drusilla and Locusta—of Tiberius and Nero—of the Borgias—of Hieronyma Spara, Tofana, Catherine de Medicis, St. Croix, and a host of other worthies, have proved charming topics for the marvellous-monger. And it would not have been an unworthy subject to bare the truths underlying the stories of generations of story-tellers, obscured as they have become by the demand of ignorant sensationalism and the terrors of a mean superstition. But this is not the subject I have proposed to myself for the discourse to-night.

"What is a Poison?"

Two difficulties present themselves in answering this question:—

1. *The law has not defined a poison, notwithstanding that the law at times demands of science the definition of a poison.*

I know a case, for example, where a prisoner, indicted for the administration of a poison, escaped, because the scientific witness declined to say that the drug administered by the prisoner was a poison.

2. *The popular definition of a poison is far from being a sound, much less a scientific definition.* Generally speaking, it comes to this, that "A poison is a drug that kills rapidly when administered in a small quantity."

The phrase "a small quantity" as regards weight, and the word "rapidly" as regards time, are as indefinite as the classical piece of chalk as regards size.

I define a poison as—

"Any substance which otherwise than by the agency of heat or electricity is capable of destroying life, either by chemical action on the tissues of the living body, or by physiological action after absorption into the living system."

(A) It will be convenient to consider first, *What a poison is not.*

It is not an agent that destroys life by physical influences, such as heat and electricity.

It is not an agent that destroys life by any purely mechanical act (*e.g.*, pins are not poison, although fairly included in the phrase "destructive things").

It is not an agent that destroys life by the mere blocking out of that which is necessary to maintain life (*i.e.*, the action of a substance to be a poison must be more than mechanical).

This latter point requires further consideration.

Both nitrogen and carbonic acid destroy life as certainly as they extinguish a burning taper. Yet nitrogen is not a poison, whilst carbonic acid is.

Nitrogen simply destroys life by blocking out oxygen. Given the presence of 20 per cent. of oxygen, the 80 per cent. of nitrogen possesses no toxic effect.

The carbonic acid, on the contrary, is specifically toxic. The admixture of 20 per cent. or of 80 per cent. of oxygen does not materially alter the case. Oxygen or no oxygen, CO_2 is a poison.

(B) Consider next, *What a poison is.*

It is an agent capable of destroying life.

The use of the phrase *deadly* poison, is surplusage. If a body be a poison, it is deadly; if it be not deadly it is not a poison.

My definition limits the mechanism whereby the toxic effect is induced, to *chemical* and *physiological* actions. I am conscious that this definition suggests classification. Certain is it that Nature hates classification as truly as she declines definitions.

Let us trace some of these mechanisms of toxic activity. I select three illustrations of poisons belonging to different classes.

(1) *Sulphuric Acid.*—If a person swallows *sulphuric acid* the tissues with which the acid comes into contact are more or less charred:—"more or less," that is, according to the strength of the acid and the time of contact.

Charred:—This implies a chemical act, dependent on the power of sulphuric acid to combine with water.

The portion of the body thus charred dies. We call this *molecular* death. (This does not imply that *the person* is dead. Health is disturbed. Health is derived from the old Saxon word "Wholth," signifying *entirety*. Health implies the perfect rhythmicity of the bodily functions. It is that condition expressed with charming simplicity by Suffolk folk, who describe being "quite well" by the phrase, "*they feel all over alike.*" The charring process (molecular death) has disturbed rhythmicity.) Before long all the members suffer with the charred stomach. The death, localised in the first instance, becomes general, the death of the entire body, *i.e.*, of the person, eventually taking place. We call that *somatic* death. This is poisoning by sulphuric acid. But the primary act of disturbance—the first interference with the rhythmicity of health—resulted from the chemical power of sulphuric acid to combine with water. It will be evident that the chemical action of a poison depends on the chemical relationships of that poison.

(2) *Carbonic Oxide.*—Carbonic oxide is a true poison. It is a gas that may often be seen burning with a blue flame on the top of a bright fire in the open fire-stove.

Its importance amongst poisonous bodies depends on the circumstance that it is evolved in many manufacturing operations (*e.g.*, lime and brick kilns, iron blast furnaces, copper-refining furnaces, etc.), and that it is always present in small quantity in coal gas, constituting its true toxic constituent.

What then is the mechanism whereby carbonic oxide destroys life?—The active agent of the blood is its red colouring matter (*hæmoglobin*). To the chemist this substance abounds in wonder.

We have reason to believe that hæmoglobin is formed from the albumenoids, the synthesis of which albumenoids is limited to the vegetable. Essential as the albumenoids are to animal life, the animal is dependent for their formation on the synthetical processes taking place in the plant laboratory. The animal, however, can transmute one albumenoid into another (*e.g.*, he can change albumen into a peptone), whilst he can also form from them bodies of less complicated constitution (*e.g.*, fat):—in other words, he can lower them in the scale. But, save with one exception, he cannot use them to effect higher synthetical formations. This single exception is hæmoglobin.

It is no matter for surprise that a body like hæmoglobin—one of the chief actors, so to speak, in the curious drama of life and living—which comes on the scene through a stage opening, of which we neither know construction nor whereabouts—should possess unique chemical properties and relationships. I shall only trouble you this evening with one of these relationships.

As a general rule, a substance that combines with oxygen with difficulty, parts from it with ease, and *vice versa*. It is difficult to make gold combine with oxygen, but it is easy to decompose oxide of gold. Potassium easily combines with oxygen, but it required the genius of a Davy, and the resources of the Royal Institution, to separate potassium and oxygen.

In hæmoglobin, however, we have a substance that combines with, and delivers up, its oxygen (*i.e.*, is oxidised and reduced) with almost equal facility under similar conditions. Upon this and other chemical characteristics of hæmoglobin—as the oxygen-receiver, the oxygen-carrier, the oxygen-deliverer, the carbonic-acid receiver, carrier, and deliverer—the act of living depends. In other words, life depends on *the integrity* of the hæmoglobin—on the rhythmicity of those chemical processes, in effecting which hæmoglobin is the primary worker.

With these facts before us, let us turn to the toxic action of carbonic oxide.

The hæmoglobin at once seizes upon and combines with the carbonic oxide, carbonic-oxide-hæmoglobin being formed.

Two difficulties arise:—

1. The hæmoglobin, saturated with carbonic oxide, cannot combine with oxygen. Regarding hæmoglobin as a *common carrier*, the carriage is full.

2. The hæmoglobin, being saturated with carbonic oxide, cannot get rid of the carbonic oxide under the ordinary conditions of respiration and circulation. Again, regarding the hæmoglobin as a common carrier, the vehicle, full up, cannot be unloaded.

To put all this in scientific phraseology, carbonic-oxide-hæmoglobin is a comparatively stable compound, being neither decomposed by the presence of an excess of oxygen (as in the lungs) nor by carbonic acid. What must happen? The man dies because the integrity of the hæmoglobin has been disturbed—because the normal sequence of its oxidation and reduction has been interrupted by the formation of carbonic-oxide-hæmoglobin.

We call the result of all these chemical actions and interferences, poisoning by carbonic oxide.

3. *Strychnine* (the poison derived from St. Ignatius' Bean).

How does strychnine act? We know sadly little about it—so little that we use the phrase "physiological action" to express our want of knowledge. But we know something.

A marked chemical characteristic of strychnine is its power to combine with oxygen when the oxygen is presented to it in a nascent form.

Note then the conditions. Strychnine is in the body. There is also present in the blood, hæmoglobin loosely combined with oxygen, which oxygen the hæmoglobin is always ready to give up on first demand. We are able to trace this action, and to see that the period of the primary strychnine fit coincides with the reduction of the hæmoglobin.

Why (you ask) does that kill? I cannot tell you. It is the highest form of knowledge to see the limits of positive knowledge, and to make that the starting-point for fresh inquiry.

From what I have said, it will be evident that my object has been to trace toxic energy to the chemical action of poisons on living tissues or fluids. The phrase "physiological action" must not be understood as implying any theory *re modus operandi*. There is a danger lest the phrase "physiological action" should be employed, or regarded, as explanatory. It no more explains (be it remembered) the action of certain drugs on the living body than the word catalysis explains fermentation.

There naturally follows on what I have said respecting this chemical action of poisons, the following important question :—

Given knowledge of certain properties of the elements, such as their atomic weights, their relative position according to the periodic law, their spectroscopic characters, etc. ;—or given knowledge of the chemical composition, the molecular constitution, together with the general chemical and physical properties of compounds, in other words, given such knowledge of the element or compound as may be learnt in a laboratory —does such knowledge afford any clue whereby we may predicate the probable action of the element or of the compound respectively, on the living body?

1st. Let us limit our attention to the *elements*.

The starting-point of this inquiry was the toxic properties of the metals. The work of Blake (1841) in this direction was afterwards extended by Rabuteau (1867). Their observations led them to the general conclusion, that "the physiological activity of the metals increased with their atomic weight." This broad general statement was modified at a later period by noting that the reverse was the case with certain groups of metals. Thus potassium (39) is more poisonous than sodium (23), and barium (137) more poisonous than calcium (41). These facts led Rabuteau to the conclusion, that any comparisons of toxicity must be limited to the metals belonging to the same group. Husemann and Richet, however, pointed out that even this rule did not hold good, seeing that lithium having an atomic weight of 7, was far more poisonous than either sodium or potassium.

Experiments on the metals were further conducted by Richet with the metallic chlorides. Grain by grain, at intervals of forty-eight hours, he added the chlorides to water in which he kept fish of a given kind. He then recorded the maximum strength of the solution of the metallic chloride in which these said fish would live for forty-eight hours. The conclusion at which he arrived was that the limits of the toxicity of a metal bore no relationship either to its atomic weight, or to any other chemical or physical characteristic of the metal.

Bouchardat and Stewart Cooper, in a similar manner, experimented with the non-metals. Selecting the haloid group of elements, they noted that their toxicity was inversely to their atomic weight, fluorine (19) being the most poisonous, and iodine (127) the least poisonous of the group, chlorine (35·5) and bromine (80) occupying their proper intermediate positions. But here again the group theory was inevitable. What was true of monad elements was not true of the elements of higher atomicity, the toxicity of selenium (79) being far greater than that of sulphur (32).

With these facts before us there arises this question, Was a relationship to be expected between physiological action and atomic weight? One poison acts on muscles—a second on nerves and nerve-centres—a third on the blood :—Is it likely, even supposing a relationship to exist between a certain group of elements and a given organ or a given structure, that the relationship would be the same in the case of all organs and all structures? These researches (the outline of which I have briefly indicated) suggest this much to future observers, viz. : First of all group your poisons according to their methods of operation, and then see how far the degree of toxicity of the terms of any one group show relationship to the atomic weights of such group.

But the difficulties of comparison thicken, when we consider the physiological action of certain allotropic modifications of the elements.

Thus compare *yellow* phosphorus, a body readily inflammable, soluble in bisulphide of carbon, firing by contact with iodine, with *red* phosphorus, a body at variance with the yellow variety in the three respects named. Nor is this all. For *yellow* phosphorus is an active poison, 2 grains being a certainly toxic dose, whilst *red* phosphorus is an absolutely inert body.

Take a second illustration. In its ordinary form oxygen plays the part of a life sustainer. But oxygen is only a life sustainer in its common form and at ordinary pressure.

On this latter point I have no time to dwell, save to mention that if an animal be exposed to oxygen at three pressures, the resulting symptoms are not unlike those induced by strychnine.

There is, however, an allotropic form of oxygen called *ozone*. The physiological action of ozone was the subject of a communication to the Royal Society of Edinburgh by Dewar and McKendrick (1873). Their experiments were made on both cold and warm-blooded animals, including amongst the latter themselves and their assistants.

The results are remarkable, more particularly when we remember that the air with which they operated, at most only contained 10 per cent. of ozone.

Placing a large frog in a jar of air, and then ozonizing the air, the frog in about half a minute closed its eyes, the respirations fell from 96 to 8 per minute, and the body temperature was lowered 4° or 5° C. The animal recovered in about eight minutes, when pure air was admitted into the receiver. Death resulted if the animal was exposed for any lengthened period to the action of the ozonized air.

As regards the action of ozone on warm-blooded animals, Dewar records certain personal experiences, chief amongst which were a tendency to breathe slowly, and enfeebled pulse, and fits of sneezing.

But now comes the curious part of the story, viz., that at the *post-mortem* on the animals that died under the influence of ozone, the blood was found to be *venous*. (The results were similar when pure ozonized oxygen was employed.) It is most remarkable that the *post-mortem* appearances of death from an intensified oxygen should resemble those of death from carbonic acid.

I give these illustrations to show why there should be reason to doubt whether the physical or chemical properties of an element can ever suggest either toxic activity or physiological action.

2nd. *Compounds*.

Is there any relationship between the chemical composition or constitution of a compound body and its physiological action?

The first series of researches on this question was directed to determining whether, in the case of a salt,

the acid or the base was, physiologically, the most important ingredient (Blake 1841).

No doubt most often the active agent of a salt is the base, but this is by no means uniformly the case. Probably the solubility of a compound and the different proportions of acid to base in the salt (*i.e.*, whether the compound in question be an acid or a basic salt) are agencies which also help to determine the toxicity of the body and its physiological action.

A second series of experiments was made by Blake for the purpose of showing that, given a series of isomorphic salts, the intensity of physiological action increased with the molecular weight. He further contended that salts crystallizing in different forms had different physiological actions. On this basis he constructed a series of nine groups of salts, each group being characterised by special physiological actions, insisting with much reason that we possess in living matter a reagent (so to speak) capable of aiding us in our investigations into the molecular properties of chemical compounds. If from molecular constitution you can determine physiological action, probably from physiological action, conversely, you may determine molecular constitution.

Another series of experiments in a similar direction were made by Schoff on the Continent, and by Fraser and Crum Brown in this country.

Of these experiments the most important are those indicating how from bodies of vastly different physiological action you may obtain derivatives having similar properties.

For example, the physiological action of *strychnine* is primarily exerted on the spinal cord. As a result, convulsions occur as a prominent symptom. But if we introduce into the strychnine molecule a methyl group (forming methyl-strychnine), the action of the drug is altered—methyl-strychnine paralysing (strychnine stimulating) the motor nerves.

But here comes a curious fact. If we take morphine, or nicotine, or atropine, or quinine, or veratrine (none of which bodies are comparable in their physiological action to strychnine), and convert them into their methyl derivatives, the methyl compounds formed (viz., methyl-morphine, methyl-nicotine, etc.) are comparable in their physiological action to methyl-strychnine.

We must admit these experiments to be striking. One treasures any experiment suggestive of the chemical constitution of a body indicating physiological action.

But again:—The true physiological action of a drug is not so much its general as its selective action, this selective action being largely dependent on the *dose* administered and the mode of administration.

For example: Inject into the circulation of a frog a *small* dose of *veratrine*, great muscular stiffness results, a *large* dose similarly administered not producing this effect. And now change the method of administration. Apply the *small* dose directly to the muscle, you get no symptom; but apply the *large* dose directly, and great muscular stiffness results. Here see the modifying influence of dose and of the mode of administration.

Again, the difficulty of "allotropism" in the case of elements, finds its counterpart in "isomerism" in the case of compounds. Thus cyanogen and paracyanogen are bodies of identical *percentage* composition, and yet cyanogen is one of the most poisonous of gases, whilst paracyanogen is one of the most inert of solids.

Or, again, take *piperine* and *morphine*. These bodies are of identical percentage and molecular composition. They agree (it is true) in being poisons. But how vastly different their physiological action!—the one an extreme irritant, the other a powerful narcotic.

I fear we must admit that, as no *a priori* reasoning could predict that by combining copper and sulphuric acid a blue salt would be formed, so no *a priori* reasoning, no knowledge of chemical constitution, can predicate what will be the special organ on which any given poison will act, nor, even supposing that the organ upon which the chemical activity of the drug will be exerted be known, what will be the nature of such chemical action. The science of drugs, like the science of chemistry, is, and must ever remain, an experimental science.

And, be it remembered, the poisons of the toxicologist are the medicines of the physician. Physiological action is a subject-matter for experiment. Let the guard be jealously set and as rigidly maintained to prevent cruelty to animals; but ask yourselves, whether to rob the higher creation of life and health rather than that one of the lower creation should suffer, be not a refinement of cruelty—the cruelty of cruelties? "Are ye not of much greater value than they?" speaks a still small voice amidst the noisy babble of well-intentioned enthusiasts.

Two general observations are suggested. And this first: The later age history of poisoning is the history of a profession. This profession we find closely associated, not only with the profession of medicine (the art of healing), but with witchcraft, incantation, and charms. The threefold arts of poisoning, witchcraft, and medicine, moreover, became so closely allied to religion, as to claim, each and all, the shield of a sacred sanction and the protection of a Divine voice. Even that very word φάρμακις, the Greek for "*a dispenser of medicines*," is the same word used to imply "*a witch*" and "*a poisoner*." The modern scientist has once and for ever shattered the bond that united science with superstition. It was a special ministry of science to teach men that in the preparation of medicines the pharmacist required no stuffed crocodile to preside over the mysteries of his laboratory, nor incantation to give virtue to his drugs!

And this secondly: The villanies of the early poisoners can never again be practised in the light of the science of the nineteenth century. Science can and has done what legislation could never do. The Hebrew Scriptures speak of a time when "the sucking child shall play on the hole of the asp, and the weaned child shall put his hand on the basilisk's den" (Is. xi. 8, Rev. Ver.). Is not science working out some such consummation as this? I claim that a science which, like a blood-hound, can track with cunning scent the minutest atom of a poison in the body, *is* helping forward the day when poison shall cease to be the instrument of a secret treachery, because there are eyes it cannot hope to evade, and a science whose investigations it will not dare to defy.

Provincial Transactions.

SOCIETY OF CHEMICAL INDUSTRY.

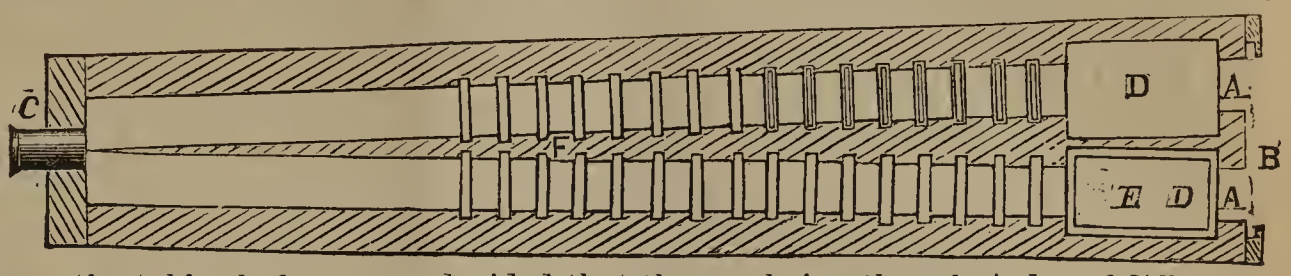
A Description of the Tintometer, with some Remarks on its Application to Chemical Analysis.*

BY J. W. LOVIBOND.

In a paper of this nature it would be out of place to enter further into general laws than is necessary for the purpose of illustration. I have therefore confined my remarks, as far as possible, to a description of the construction and use of the instrument, which consists of a tube divided by a central taper partition B terminating in a knife edge at the eye-piece C. This knife edge, being inside the range of vision, is not seen when the instrument is in use. At the other end of the instrument are two apertures, D D, of equal value, alterable in size and shape by means of diaphragms. The two apertures are here divided by the thick end of the central partition B, which, together with the sides,

* Read at a meeting of the Liverpool Section of the Society of Chemical Industry, June. From the Society's Journal.

is recessed by grooves in order to hide the edges of the standard glasses and of the vessels placed in the tube for observation. The top is provided with slots in line with the grooves, to admit and guide the standard glasses; and the whole is arranged in such a manner that the only light which can reach the eye must pass in equal quantities on each side of the partition, up the two tubes, illuminating the object under examination on one side and the measuring glasses on the other. A reference to the diagrams and to the standard instrument and glasses on the tables before you will show the arrangement.



For measuring colour in opaque objects the instrument is fitted to a hinged stand, capable of being placed at such an angle as reflects the light from the whitened bottom and sides through the tubes to the eye, so that on looking through the eye-piece two white equal fields of view are seen. The object to be measured is placed on the stage under one tube, and the standard glasses worked in the other, against the white background.

The instrument as now shown is the sum-total of attempts to overcome difficulties which were discovered and met in detail whilst carrying on colour investigations of a commercial character, and until remedied made the work unreliable and misleading. The causes of error were traced to many and various sources: to the intensity of light from opposite directions morning and evening, to the lights and shadows cast by large objects both outside and inside the room, to the window or apparatus not being central, to the bars of the window, and even to reflection from the section of wall outside the window. Also, until tubes were discarded in favour of parallel-sided vessels, the convexity of the tubes, which magnified these errors as by a lens, caused disappointment, after apparently obtaining a perfect balance of colour, to find that a small alteration of position entirely upset the most careful reading.

The standard glasses consist of coloured slips cut to a size fitting the grooves of the instrument. The slips are arranged in series, all the slips of each series are of the same colour, varying only in depth of colour; the variation is in regular degrees, each degree being of the same tint-value as that chosen for the starting point or unit of the series. Thus a single glass of 10° tint-value has the same value as 10 glasses, each of 1°. Every slip is marked with the number of degrees or the tint-number which it represents, and also with a denominational or *colour-number* showing to which series the slip belongs.

The tint formed by the superposition of several glasses belonging to the same colour series is equal to the aggregate of tint-numbers on the glasses used, whilst the superposition of glasses from several series gives a compound colour which follows the laws applicable to the mixture of pigments, in contradistinction to the laws belonging to the mixture of spectrum colours.

In fixing the value of the unit the first effort made was to find a basis of common value applicable to all colours, but the unequal absorption of light by different colours proved an effectual barrier, some building into darkness by superposition of glasses at a much quicker rate than others, thus, with a medium north daylight a red requires 77 of its own units, a blue 222, and a yellow 239. The differences are still greater in more composite colours.

From this it was evident that each colour having its individual rate of absorption, it must have its individual progressive unit, which, with a few exceptions, is not applicable to another colour.

This enforced limitation of the value of each unit to its own colour is, as regards a common basical unit, restrictive, but beyond that point very expansive, permitting the unlimited addition of new colours for standards without in any way altering the value of those already in use, or interfering with the value of registered work previously done. It was ultimately decided that the eye being the sole judge of difference, and noting that the powers of differentiation decreased as the tint increased in depth, the tint unit should be as light as consistent with the possibility of the addition of a single unit being distinguishable in the deeper shades; while for lighter shades, where the perception is keener, the tint unit may be divided, if necessary, into decimals of the original unit. The range of colour which can thus be brought to measurement is very wide, ranging from most of the brilliant aniline colours to the dingiest cloth, the only apparent limit lies in the variety of coloured glass obtainable for standards.

Adopting Professor Church's definition of all visible bodies as being either luminous or illuminated, I propose first to deal with luminous bodies in reference to their measurement for intensity and colour.

To measure for intensity, having closed one tube by a stop, it is necessary to pass the rays to be measured through the other tube, under definite conditions as to distance, area, screen or other governing influences, then intersecting these rays with graded glasses of a neutral tint, until the light is entirely blotted out, when the number of degrees required to accomplish this can be read off, and will be an index of intensity.

Circumstances have prevented much attention being as yet given to the colour of illuminants, and I can do little more than suggest some few precautions which would probably occur to an investigator. Rays from the illuminant should be caught on a screen commanded by one tube under known conditions, as already described in measuring for intensity, whilst the other tube should command a standard white field of view against which to work the measuring glasses.

For measuring and recording tint and colour in transparent liquids, a graduated series of accurately gauged vessels with parallel colourless glass ends are adapted to the instrument. These range in thickness from $\frac{1}{16}$ of an inch to 2 feet, the smaller vessels being suitable for the darker liquids, whilst the blue colour in distilled water can be easily measured in 2 feet. Care must, however, be given both in the distillation and to the pure whiteness of the background.

When the colour of a liquid represents a property or substance the graded glasses of different lengths and the colour-scale afford a ready means of quantitative estimation of extreme nicety and ease of management, carrying the accuracy of the balance beyond weighable quantities down to the smallest colour trace, as well as being available for larger percentages. The method has been applied to the estimation of colour in dyes, Nessler's ammonia test, carbon in steel, copper both as nitrate and ferrocyanide. It is also under examination for lead as sulphide; here the presence of iron would be a disturbing element. There must be many such possible applications, which would often effect a saving of time and labour by avoiding the necessity of evaporation, drying and weighing, as well as estimating percentages too small for the balance.

The conditions to be complied with are, first the colour must bear a definite relation to the substance

producing it, and must be in most cases matchable by the glasses of a single colour series. Then by means of a solution of known strength in one of the gauged glasses, the percentage of substance represented by the tint of a single unit must be found by direct experiment. In estimating an unknown sample of a similar substance, it would therefore be theoretically only necessary to use the same gauged glass, and multiply the units required to match it by the percentage value of a single unit; but this cannot always be done, as the progressive variations in the colour properties of different substances require great care before finally deciding on the percentage value of a single tint-unit, for the law of regular progression does not always hold, and percentage estimations by means of colour can only be made within this law. The great majority of coloured solutions will, however, at some point of dilution, give the necessary conditions for a quantitative estimation.

In making preparations for colour testing by methods now in use, such as Eggertz' carbon test, and Nessler's ammonia test, the apparatus should be specially useful as a check upon all possible errors which may arise in preparation, and by bringing the practice of all laboratories to a common standard of reference. It is also found useful in noting and recording changes of colour and tint caused by chemical action, time or other cause.

In measuring colour in opaque objects the instrument is fitted to a hinged stand capable of being placed at such an angle as reflects the light through the tubes from a stage on which is placed the object under examination, and a pressed plaster of Paris reflector as a standard white to measure from, or the substance to be compared or matched.

Reviews.

FORMULAIRE PRATIQUE DE THÉRAPEUTIQUE ET DE PHARMACOLOGIE. Par DUJARDIN-BEAUMETZ et P. YVON. Troisième Tirage de 1887.*

NOUVEAU FORMULAIRE MAGISTRAL. Par A. BOUCHARDAT et G. BOUCHARDAT. Vingt-septième édition.†

THE NATIONAL FORMULARY OF UNOFFICIAL PREPARATIONS. First Issue. By Authority of the AMERICAN PHARMACEUTICAL ASSOCIATION.‡

These three books, taken altogether, may be viewed as representing somewhat ancient and modern French pharmacy, and what is euphemistically called "elegant" American pharmacy.

The first, the Formulary of MM. Dujardin-Beaumetz and Yvon, although only published in April last year, reached a third issue by December, thus showing that it has been appreciated by our French neighbours. Following the example of a similar English work, much of this success is probably due to the combination of a medical practitioner and pharmacist acting together as collaborators.

The book is divided into six sections:—Pharmaceutical Formulary, Therapeutic Hygiene, Mineral Waters, Poisonings and Antidotes and the Examination of Urine. In each section the subjects are arranged alphabetically: alkaloids are placed under the plants which yield them, and chemicals are placed after the substance which constitutes the most active element in the medicament, *e.g.*, *bromides* are placed under *bromine*. Thus an index or table of materials is, the authors think, not necessitated. There is a table of authors and one of medicaments, the latter being in reality an index of the medicinal properties of the medicaments; thus we find "*Coliques. Pilules contre*" referred to p. 39. This want of a general index is certainly a defect, especially in such a book, in which the busy practitioner wants to make a quick reference. For example, having read a sentence about wines, we wish to refer to it again, and looking under the Formulaire heading *Vin*, find "*Vin.—v. Alcool.*" But under "*Alcool*" the subject of wines is not mentioned. We eventually find wines treated of under the section of Therapeutic Hygiene. The Pharmaceutical Formulary proper, or *Formulaire de Pharmacologie*, has chapters on (1) The Art of Prescribing, (2) Magistral Formulary, (3) Formulary for Sub-cutaneous Injections, and (4) Special Antiseptic Formulary. Of course, the metric system of weights is used, but when drops (*gouttes*) are spoken of their number is expressed in Roman figures or numerals. Under each heading numerous formulæ, as a rule, are given, generally referred to well-known authorities, and in cases where a prescriber orders a medicine under a name for which there are several formulæ, without indicating which is intended, the pharmacist is directed to supply the least active,

The information conveyed in the 'Magistral Formulary' is generally terse, sometimes meagre, at times erroneous, and in the case of nitrite of amyl the same information (limited to seven lines), in not identical words, it is true, is conveyed both under the heading of *Amyle (nitrite d')* and *Nitrite d'Amyle*. Ichthyol, we suppose, is too German to have a correct definition to it. It is described as "a product of the distillation of a bituminous rock found in the environs of Seefold (Tyrol); slightly soluble in ether and alcohol, miscible with vaseline and oils." The fact is overlooked that the distillate requires neutralizing with ammonia to form the substance generally known as ichthyol in commerce. The lithium, sodium, and zinc ichthyols are not mentioned. No further information regarding the source of iodol is given than its formula, $C^4\ I^4\ Az\ H$. Butyl-chloral is not mentioned, not even as a synonym under "*Chloral Crotonique, Syn. Croton Chloral.*" Nor is nitroglycerine mentioned, except as a synonym under *Trinitrine*. The cross references are very imperfectly carried out. Under nitroglycerine, among the hypodermic injections, we find the following formula:—

Alcoholic Solution of Trinitrine, 1 per cent., 30 drops. (xxx gouttes, *sic.*)

Cherry Laurel Water, 8 gr. 40 centigr. to 10 gr.

To our English ideas this appears very indefinite; we manage to obtain greater exactness with our old-fashioned weights and measures. The liquefactions which take place with mixtures of menthol with thymol, with phenol, with hydrate of chloral, with camphor, and with croton chloral are given in the same proportions as in the 'Extra Pharmacopœia,' in exactly the same order, without any acknowledgment of their English origin, and they are recommended for calming toothache. Vaseline has the synonyms *Pétroleïne* and *Cosmoline* given it, and the name *Pétrovaseline* (misprinted *Pétrobasaline*) or *huile de vaseline* is given to a vaseline liquid at the ordinary temperature. This liquid vaseline is recommended as an excellent vehicle in which to dissolve active principles for subcutaneous injection. In the chapter on hypodermic injections numerous formulæ are given in which it is used together with phenol, thymol, menthol, helenin, iodoform, iodine, cocaine. Mixtures of this liquid vaseline and chloroform in various proportions are also recommended for dissolving salol, aconitine, digitalin, quinine, eserine, atropine, hyoscine, duboisine, etc. These solutions are no doubt stable—at least will not become fungoid—but those containing chloroform are liable to loss of that ingredient by volatilization, which must make their strength uncertain. The solutions used for injection on the Continent are much

* Paris: O. Doin. 1888. 18mo. Pp. 1–610. 4 fr.
† Paris: F. Alcan. 1888. 18mo. Pp. 1–700. 3 fr. 50c.
‡ American Pharmaceutical Association. 1888. Royal vo. Pp. 1–176.

less concentrated than those used in this country. As a rule, a Pravas' syringeful, of the capacity of 1 c.c., forms one dose. Our readers will find the subject of hypodermic medication well treated, but the solutions will require to be made stronger to suit English practitioners. The chapter on *Antisepsie Chirurgicale* does not give the latest English ideas on the subject. The antiseptic catgut ligatures are directed to be made by the old formula of Lister, in which the gut is impregnated by immersion in hydrated carbolic oil. They are good when made in that way, but the process of preparing them is slow and tedious. Since publishing the above Sir J. Lister has devised three other processes for producing the moist chromic, the dry chromic, and the tannic catgut ligatures. The process for preparing carbolic acid gauze (*Gaze Phéniquée*, Lister) is similar to that given in Bouchardat, resin being used to fix the carbolic acid, with alcohol and glycerine as its solvents to impregnate the gauze. Neither alcohol nor glycerine are used in Lister's process, nor does he authorise the use of alcohol or glycerine in his carbolic lotion, as stated.

The chapter on therapeutic hygiene does not fall much within our province. Aerotherapy, electrotherapy, hydrotherapy, kinesitherapy (gymnastics), massage, and the hydrofluoric acid inhalation treatment, as well as the gaseous treatment of phthisis by rectal injections of sulphuretted hydrogen and carbonic acid, all receive due attention.

A considerable section (74 pp.) of the book is devoted to mineral waters, a small section to poisonings and antidotes, and another to the examination of urine. These, with eighty pages of advertisements, principally of French specialties, go to make up the whole. Having thus given an outline of the work and pointed out minor defects, we nevertheless commend the book to our readers, who will find it useful for reference, and specially so to those who want an insight into French pharmacy as it is.

The work of MM. A. Bouchardat et G. Bouchardat (père et fils), notwithstanding the death of the father, still retains its old name *Nouveau Formulaire Magistral*, although it has reached its twenty-seventh edition. It is modernized and brought fairly well up to date. But slips do occur and British Pharmacopœias do not appear to be the *forte* of M. Bouchardat *fils*.

For example, in the table of abbreviations we have Ph. *Lond.* given as the contraction for Pharmacopée de Londrès, but no mention of the British Pharmacopœia is made in this table, although it is frequently referred to in the text under the contraction of Ph. Brit. and often erroneously. Thus, on p. 178, we have "Pulv. Cretæ Aromat." (Ph. Brit.), composed of aromatic powder (Brit. Ph.) 1360·8, carbonate of lime (*carbonate de chaux*) 153·6. This formula can only refer to the obsolete British Pharmacopœia of 1864, in which the formula for the above was "Prepared chalk, 1 pound; aromatic powder, 3 pounds" (1 to 3, not 1 to about 9, as given by Bouchardat). The formula given for "pulv. aromatic," Ph. Brit., is that taken from the above obsolete B.P., and on the same page three other formulæ are still retained, taken from the old London Pharmacopœia, 1851; these are:—Confect. arom., *poudre cannelle* (with the formula for pulvis cinnamomi compositus attached to it), and *Sirop gingembre* (Ph. Lond.), *sic*, in which sliced ginger was infused in boiling water, and the sugar was ordered to be dissolved in the strained starchy infusion. Again, on p. 236, we have the formula given for *sirop de séné* (Ph. Lond.), always an unsatisfactory one. Likewise, we have a formula for tinct. sennæ *comp.* (Ph. Brit.): the *comp.* of this title has never appeared in the British Pharmacopœia. We find three pages of new matter have been added describing subcutaneous or hypodermic injections. In France cherry-laurel water and meadow-sweet water seem to find favour as solvents for medicaments used hypodermically. The use of liquid vaseline and of mixtures of this with chloroform, as vehicles for dissolving the active medicaments, as mentioned in our review of the previous work, are also described. Among the formulæ one is given for *Pilules de* Holloway (the same appears in the work of MM. Dujardin-Beaumetz et Yvon), in which gamboge, the most important purgative supposed to be contained in them, is not mentioned. Among the *Recettes diverses pour pansements antiseptiques*, the same errors occur in regard to *gaze phéniquée* (Lister), and *cat-gut* (Lister), as appear in the other work. *Huile Phéniquée* (Lister) is stated to contain *essence de wintergreen*, *q.s.*! The new antipyretics, antipyrin, antifebrin, salol, kairin and thallin meet with their share of attention.

Passing to the 'National Formulary of Unofficinal Preparations,' published by the American Pharmaceutical Association, we have a compilation of 435 formulæ, issued by authority of the above body. As medical practitioners have now so little opportunity of learning the art of dispensing, without which they can never become good prescribers, it is in the interests of pharmacy that acceptable practical formulæ should be published, so that the whole of the craft might reap the benefit. Individuals might still excel and justly attain greater success, while secrecy and exclusiveness would be avoided. In this age the thing that is wanted must be ready for use. We find the medical practitioner too often will not take the trouble to prescribe; he wants this done for him and the preparation ready for use, and since the want of a book on 'Prescribing Made Easy' has been particularly felt by our American cousins, they have set to work and compiled one. This is probably the best mode of cutting the ground from under the feet of the nostrum-monger, who is ever ready to entrap the prescriber with his attractive advertisements in the medical journals of "just the thing he wants." Many medical practitioners want to "throw physic to the dogs;" with such men, as a rule, practice takes the same course. But it is of no use pharmacists sitting down to whine on this account; they have to live by their art, and it is their duty to bestir themselves and not let their art decay. The art of pharmacy, if well learnt, will have its reward; the public will pay for it. In this light there is a field for work in the Unofficial Formulary of the British Pharmaceutical Conference. The sacrifice made by the members of the New York Committee in time, labour and original experiment, must have been very considerable. It is true the formulæ they have published are not altogether such as meet our requirements. Many of the formulæ are more of the nature of receipts than medical formulæ. For instance, under a Latin name three formulæ are given for battery fluid; besides which there are such preparations as eau sédative de Raspail, witchhazel water, boroglycerin (syn. boroglyceride), corn collodion, solution of carmine, Fehling's solution (modified), liquid rennet, liquor pancreaticus, pancreatin, pepsin, aromatic pepsin, saccharated pepsin, soluble essence of ginger, *phenol sodique*, Godfrey's cordial, Squibb's mixture, artificial Carlsbad and Vichy salts, Warburg's tincture, a mixture supposed to represent bromidia, and Dobell's solution of borate of sodium, bicarbonate of sodium, carbolic acid, glycerine and water, for use as a nasal douche. This last mentioned solution by the evolution of carbonic acid will often burst the bottles containing it, yet no note of caution is added to that effect. Twelve formulæ for emulsions of cod liver oil, simple and compound, are inserted, and in these perhaps more than any other of the preparations is brought out the difficulty of compiling such a formulary. The difficulty of *flavouring*, for instance, is one on which a committee can never agree, especially if they know *what the flavouring is composed of*. In this instance the committee give seven alternatives of simple or

compound flavours, including gaultheria, sassafras, bitter almond, neroli and cloves, or mixtures of these. The formula for aqua chloroformi is purified chloroform 1 fluid part to distilled water 160 fluid parts; afttr being agitated till the chloroform is all dissolved, or until only a small quantity remains which cannot be dissolved by further agitation, the product is to be filtered (!) in a covered funnel. Diluted hypophosphorous acid is a 10 per cent. solution prepared by mixing an aqueous solution of hypophosphite of potassium with a solution of tartaric acid in diluted alcohol. The clear liquid is decanted, filtered, evaporated to drive off the spirit, and adjusted in strength by dilution with water; or it may be concentrated to contain 50 per cent. of real acid. A formula is given for mucilage of dextrin, 1 to 2 of hot water; this is used in preparing some of the emulsions. This mucilage gelatinizes, and is to be preserved in full bottles with a layer of olive oil on the top of it. The white variety of dextrin is to be preferred, that which contains some unaltered or only partially altered starch. Vinum aurantii is not to be the temperance beverage we are accustomed to; it is to be sherry, flavoured with oil of bitter orange dissolved in alcohol, and filtered bright through powdered talc. A formula for compound wine of orange has also a sherry basis; it is identical with the compound elixir of orange of the German Pharmacopœia. Formulæ for wines of beef, of beef and iron, and of beef, iron and cinchona are given, but they are such that our Excise authorities would not allow the sale of them without a wine licence. Though we commend the work to the careful perusal of our readers, it must be remarked that many of the formulæ are not such as could appear in an official pharmacopœia; but the Committee had to take things as it found them, and in that sense has done good work. Such a collection forms the mint, anise, and cumin of the craft, and in the struggle for existence, even these are not to be despised.

Fifty-six formulæ for fluid extracts are given, preceded by general directions applied to making the whole of them; and eighty-six of the formulæ consist of the favourite elixirs. The composition of many of these appears to be unnecessarily complex. As selections of them will be published in our columns we need only remark here that nervous and general debility and weak digestion appear to be prevailing symptoms of disease in America, and that, although Maine law is in force in many of the States, small quantities of alcohol are found useful.

Obituary.

DAVID KEMP.

We regret to announce the death of Mr. David Kemp, Pharmaceutical Chemist, on Monday the 16th, at his residence in Portobello, aged 72 years.

Mr. Kemp was trained in Messrs. Duncan, Flockhart and Co.'s, Edinburgh. About forty years ago he left that house to assume the business of the late Dr. Alexander in Portobello, which he had successfully conducted until a few months ago, when increasing years and infirmities compelled him to retire.

During all these forty years Mr. Kemp had been a loyal and energetic member of the Pharmaceutical Society, having rendered important services to it in various capacities. Joining it in 1852 he was early called to be a member of the Examining Board, a position he continued to fill until seven years ago. He was also for several years President of the North British Branch, and at all meetings, whether for scientific purposes or general business, Mr. Kemp's presence might safely be reckoned on. He had also, on various occasions filled, with great acceptance, important positions in connection with the municipal affairs of Portobello.

Mr. Kemp was a self-made man; yet his attainments were of no mean order. But it was the lofty tone of his moral character, coupled with an extraordinary force and directness of expression, that made his influence so much felt by all with whom he came in contact. In his more strictly personal relations he was of a most kindly and considerate disposition; and he ever maintained a most conscientious religious profession, being senior co-pastor of the Baptist congregation at Bristo Place, Edinburgh.

Notice has also been received of the death of the following:—

On the 22nd of June, Mr. Charles Lord, Pharmaceutical Chemist, Todmorden, Yorkshire. Aged 62 years. Mr. Lord had been a Member of the Pharmaceutical Society since 1853.

On the 1st of July, Mr. Thomas Robinson Pownall, Chemist and Druggist, St. George's Road, Bolton. Aged 44 years. Mr. Pownall had been a Member of the Pharmaceutical Society since 1877.

On the 2nd of July, at Alton, Mr. Robert Kemp, Pharmaceutical Chemist, of Holloway Road, London. Aged 79 years. Mr. Kemp was one of the Founders of the Pharmaceutical Society.

On the 2nd of July, Mr. Frederick Cookson, Chemist and Druggist, Rainhill, near Liverpool. Aged 41 years.

On the 6th of July, Mr. William Cowburn, Chemist and Druggist, Normanton. Aged 60 years.

On the 9th of July, Mr. Edward Hooson, Chemist and Druggist, Stanhope. Aged 60 years.

On the 14th of July, Mr. William Abel, Chemist and Druggist, Inverurie, Aberdeenshire. Aged 67 years.

ANSWERS TO CORRESPONDENTS.

Rosicrucian.—*Tamus communis.*

Guttridge.—*Epipactis latifolia, Knautia arvensis, Galium verum, Hypericum perforatum, H. hirsutum, Carum flexuosum, Calamintha Acinos, Silene inflata, Isatis tinctoria.* Specimens sent for naming should always have numbers attached.

Emigrant.—See a letter by Mr. Martell in the *Pharmaceutical Journal* for July 2, 1881, p. 20.

W. J. Shepperd.—(1) *Valeriana officinalis.* (2) *Lychnis Flos-Cuculi.* (3) *Lychnis diurna.* (4) *Cotyledon Umbilicus.* (5) *Tamus communis.* (6) *Bryonia dioica.*

Gorton and Son.—(1) *Geranium Robertianum.* (2) *Epilobium montanum.* (3) *Barbarea intermedia.* (4) *Capsella Bursa-pastoris.* (5) *Tragopogon porrifolius.* The Curator requests us to say that a good specimen of No. 3 would be acceptable for the Herbarium.

Tamar Ostium.—No.

H. R. Jones and *W. Backhouse.*—See a paper on "Pearl Coating," by Mr. Gilmour, in the Journal for March 26, 1887, p. 781, and one on "Gelatine Coating," by Mr. Findlay, in the Journal for January 14, 1888, p. 592.

E. Polack.—(1) Too fragmentary to determine. (2) *Cornus sanguinea.* (3) *Ligustrum vulgare.*

Aconite.—(1) *Rumex crispus.* (2) *Œnanthe crocata.* (3) *Medicago lupulina.*

W. Moore.—*Calamintha Clinopodium, Stellaria media* and *Cerastium triviale.*

C. B. Waller.—Having in view the present law for libel we do not feel at liberty to publish your letter.

E. S. Peck.—(1) *Thalictrum flexuosum.* (2) *Melampyrum sylvaticum.* (3) *Epilobium montanum.* (4) *Calamintha Clinopodium.* (5) *Orchis latifolia.* (6) *Serratula tinctoria.* (7) *Lapsana communis.* (8) *Galium boreale.* (9) *Achillea Ptarmica.* (10) *Linum catharticum.* (11) *Hypericum humifusum.* (12) *Hypericum Androsœmum.* (13) *Genista tinctoria.*

J. Martin.—The official tincture only contains 1 grain of resin in a drachm, so that the deposit from that quantity of a well-made preparation should in no case be large, and in many cases there would be none.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Symons, Baldock, Moore, Arthur and Henshaw Associate.

Medicinal Gelatine Capsules.

			Containing	30	36	48
Cascara Sagrada (5 mins.), in round boxes... per doz.	7/-	In oval screw-cap bottles		—	—	—
Castor Oil, in square boxes ... ... ,,	5/-	Do.	do.	5/6	—	8/-
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Copaiba, without Name, in oval boxes ... ,,	4/9	Do.	do.	5/6	—	8/-
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Copaiba and Cubeb, in square boxes ... ,,	9/-	Do.	do.	—	11/-	—
Copaiba, Cubeb, and Buchu, in oval boxes ... ,,	8/-	Do.	do.	—	10/-	—
Copaiba, Cubeb, and Sandal-wood Oil, Flexible, in oval boxes. ,,	17/-	Do.	do.	17/-	—	25/
Oil of Male Fern (18 drops), in square boxes ,,	17/-	Do.	do.	—	18/-	—
Sandal-wood Oil, Flexible, English, in round boxes ,,	26/-	Do.	do.	—	30/-	—
Sandal-wood Oil, Flexible, Foreign, in round boxes ,,	20/-	Do.	do.	—	23/-	—
Tar, Norwegian, in square boxes ... ... ,,	6/-	Do.	do.	—	7/-	—
Terebene, pure (10 drops), in round boxes... ,,	12/-	Do.	do.	13/-	—	20/
Turpentine, in square boxes ... ... ,,	6/-	Do.	do.	—	7/-	—

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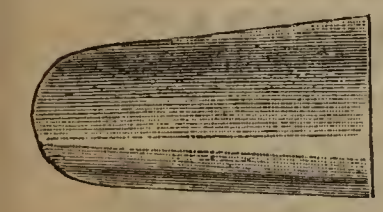

Fig. 5.

Fig. 1.

Fig. 3.

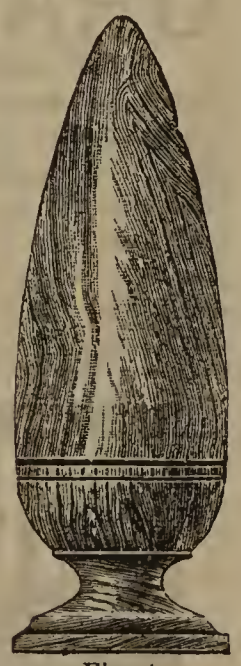

Fig. 4.

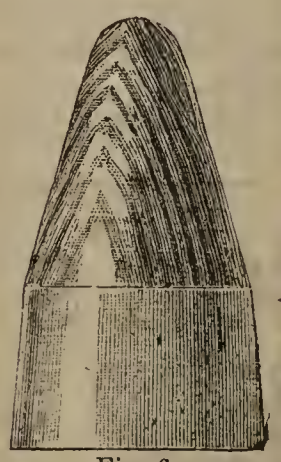

Fig 6.

Fig. 7.

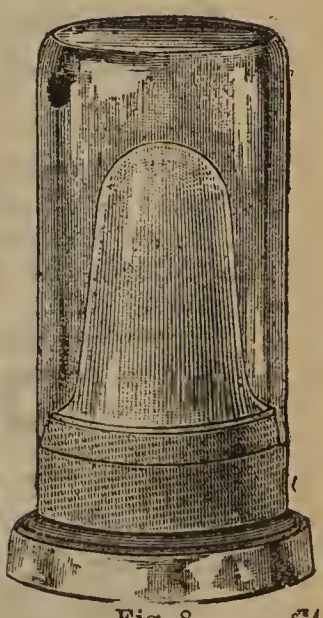

Fig. 8.

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Fig. 3 & 4.	In Boxwood Cases, per doz., 2/8 and 4/-; in Vegetable Ivory .. .. ,,	4/- and 6/-
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Fig. 6.	Mounted on Vegetable Ivory, in Glass Bottles, Screw Metal Caps .. .. ,,	4/6
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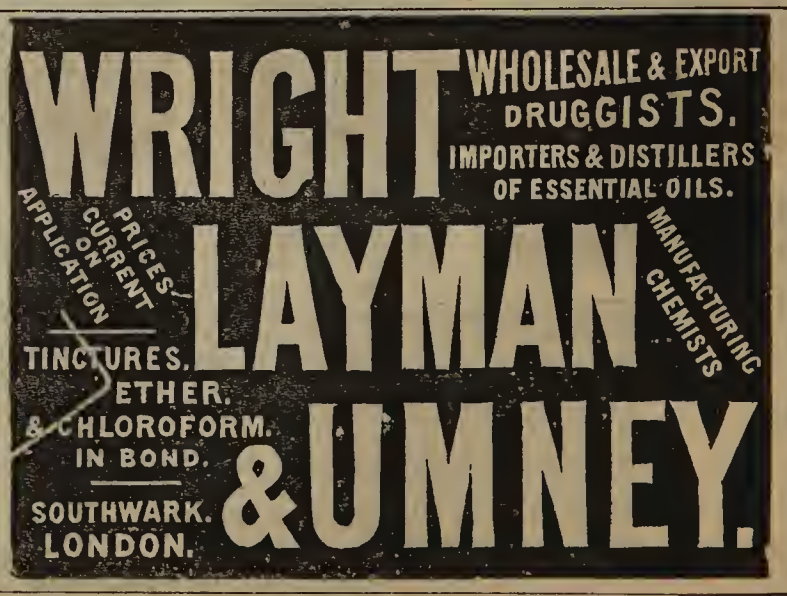

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Are easily renewed at very small cost.

Will purify very foul water and render it fit for consumption.

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FLUID MAGNESIA
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Sold by all Chemists in Large-sized Bottles (the 1s. size containing just double the quantity usually sold at same price) at 1s., 2s. 6d. and 3s. 6d. each. Also in Winchester Quarts for Dispensary and Hospital use.

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5%	Iodoform	2/9, 5/6, 18/6 „
10%	„	3/6, 7/-, 22/- „
2%	Nitrate of Silver ...	2/9, 5/6, 18/6 „
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BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 944.] SATURDAY, JULY 28, 1888. [PRICE FOURPENCE

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17, BLOOMSBURY SQUARE, LONDON.

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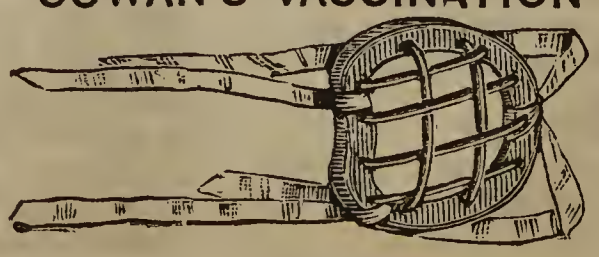

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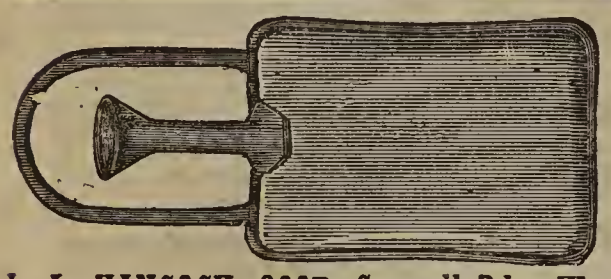
DISINFECTANTS

(FLUIDS, POWDER, SOAPS),

NON-POISONOUS, PLEASANT and BEST. Gold Medals—Calcutta, 1883-84; Paris, 1885; Antwerp, 1886.

THE "SANITAS" COMPANY, Limited, Letchford's Buildings, Bethnal Green, London.

SOLE MANUFACTURERS ALSO OF KINGZETT'S BACTERICIDES.



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ENEMAS, URINALS, FOR DAY OR NIGHT. **TUBING, CORKS, TEATS**

HOT WATER BEDS, PILLOWS, CUSHIONS, & BOTTLES.

ELASTIC STOCKINGS AND KNEE-CAPS, &c.

J. L. HANCOCK, 266P, Goswell Rd. Works: Goswell Mews, & 55, 56, 57, 58, 59, 60 & 61, Moreland St., London, E.C.

S.V.R.

PURE GRAIN SPIRIT 56 O.P. ... 18/5

Do. Do. DOUBLE DISTILLED 18/9

Cash with Order. Reductions for larger Quantities than Two Gallons.

SAMPLES FREE.

STEPHEN SMITH & CO., BOW, LONDON, E.

S. MAW, SON & THOMPSON'S
BATH GLOVES, RUBBERS, &c.

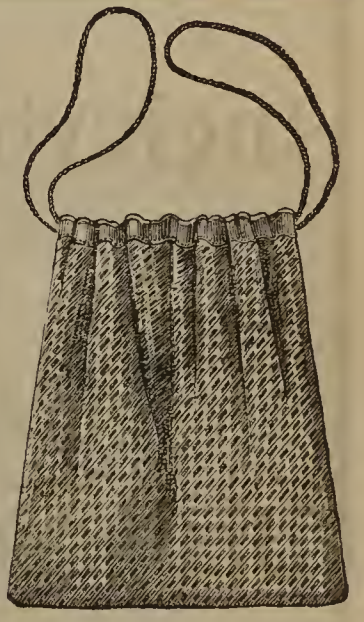
	Gloves. (Pairs.)	Straps.	Pads.
CALEFACIO OR BADEN, No. 1, soft Brown, per doz. 5/4 &	6/0	9/0	5/4
CALEFACIO OR BADEN, No. 2, hard Brown . . per doz.	6/0	9/0	5/4
CALEFACIO OR BADEN, No. 3, soft Brown, assorted patterns . . . . . per doz.	6/6	9/0	5/4
CALEFACIO OR BADEN, assorted patterns, export quality, per doz.	4/0	(*Red*	*labels*)
CALEFACIO (the U.S.), Striped soft Brown . . per doz.	6/6	9/0	5/4

	Gloves. (Pairs.)	Straps.	Pads
HONEYCOMB, White. per doz.	5/4	9/0	5/4
REVERSIBLE, No. 1, one side soft Brown, the other best White Turkish . . . . . per doz.	6/8	11/0	5/4
REVERSIBLE, No. 2, one side hard Brown, the other White Honeycomb . . . . per doz.	6/8	11/0	5/4
REVERSIBLE, No. 3, one side Egyptian Loofah, the other best White Turkish, per doz., *single*	4/0	13/0	—

TURKISH THIN WHITE GLOVES, per doz. pairs, 2/9 & 3/- PADS, per doz., 3/6
Ditto BEST QUALITY ,, 4/9 & 6/- ,, ,, 5/-

S. MAW, SON & THOMPSON'S
SUPERIOR QUALITY
WATERPROOF CHECK SPONGE BAGS

No. 1	2	3	4	5	6
7 × 6	8 × 7	9 × 8	10 × 9	11 × 10	12 × 11 inches.
6/0	7/0	9/0	11/0	12/6	16/0 per dozen.



For other descriptions see Quarterly Price Current, page 84.

S. MAW, SON & THOMPSON'S
BRIGHTON SPONGE BAGS,
WITH BALL CLASP FASTENINGS, NICKEL-PLATED.

	No. 2	3	4	5	6
	8 × 7	9 × 8	10 × 9	11 × 10	12 × 11 inches.
CHECK ...	16/0	18/0	20/0	26/0	28/0 per dozen.
PAISLEY ...	18/0	20/0	22/0	28/0	32/0 ,,

THE BRIGHTON SPONGE BAG.

7 to 12, ALDERSGATE STREET, LONDON.

WM. R. WARNER & CO.

PHARMACEUTICAL CHEMISTS.

DEPOT:

F. NEWBERY & SONS,

1, KING EDWARD STREET, NEWGATE STREET, LONDON, E.C.

The Preparations of W. R. WARNER & CO. are now in general use by Practitioners in all parts of the World, and should be kept regularly in stock by all Chemists.

Bromo-Soda

Bromide of Sodium with Caffeine, in the granular form. Very carefully and evenly made. Invaluable in Sleeplessness, Brain Fatigue arising from overwork, &c. *The Lancet* (Aug. 6, 1887, p. 265) states that "the sodium compound does, in fact, agree better (than the potassium salt) with some stomachs."

Parvules

A new class of medicines (minute pills) designed for the administration of small doses for frequent repetition in cases of children and adults. It is claimed by some practitioners that small doses given at short intervals exert a more salutary effect. The elegance and efficiency of Parvules leave nothing to be desired. The dose of any of the Parvules will vary from one to four, according to age, or the frequency of their administration. For instance, one Parvule every hour, or two every two hours, or three every three hours, and so on for adults. For children, one three times a day is the minimum dose.

Ingluvin

The essential principle of the gizzard, and bearing the same relation to poultry that pepsin does to the higher animals. A powerful nitrogenous radical was (about 1850) discovered in the gizzard, which was shown by experiment to possess many of the properties of pepsin. Where the latter refuses to act, and where, in severe cases, it has even been rejected by the stomach, Ingluvin has effected relief rapidly and with ease. (Per oz. Bottle, 4s. 6d.)

Coca Liqueur

A powerful Tonic as well as a Sedative, acting upon the nervous and muscular systems. Although harm may be done by the abuse of Coca (as of other things), this need not deter the intelligent physician from availing himself of its advantages in controlling the alchohol, opium, and tobacco habits. The Liqueur Coca of Warner & Co. is prescribed in doses of one tablespoonful, frequently repeated.

Dialysed Iron

A solution containing the Basic Oxychloride of Iron, $Fe'''_2Cl_6 23 F'''_2O_3$ —Purified by Dialysis. The instability of the preparation as generally found in the market has led us to experiment in its manufacture before supplying any under our name. The article we prepare will not precipitate or gelatinise, is neutral, of standard strength, and possesses all the properties of this valuable remedy.

☞ For the convenience of the patient, Warner & Co.'s Dialysed Iron is in 3-oz. vials, neatly boxed, and each box provided with a glass dropping tube. Physicians will please prescribe in this form, and that they may obtain a superior article, be careful to specify in all cases,

"WARNER & CO.'S" (Price 2s. 6d. per 3-oz. Bottle.)

Pill Vases

Of various sizes and patterns, with coloured and highly-finished labels. See Newbery's Catalogue for 1888 (500 pages). Free to *Chemists* on application.

Sugar-coated Pills

Unequalled in their medicinal properties or in SOLUBILITY, the best ingredients being invariably employed. W. R. Warner & Co. claim the art of Sugar-coating, which, while ensuring the adequate permanency of the coating, avoids the drying of the enclosed mass, so hard as to render it *insoluble* and *inert*. Each pill will produce the effects expected, and an experience of nearly thirty years, coupled with unremitting care and study, have enabled the manufacturers to achieve results otherwise unattainable.

DETAILED PRICE LIST Mailed to Chemists and Merchants in any country, on application to

F. NEWBERY & SONS (Estab. A.D. 1746), 1, King Edward St., London, E.C.

FOR TRAVELLERS.

LONDON.] JULY 28TH. [1888

Portable Drugs.

The "Tabloids" furnish all the advantages of pills, with none of their disadvantages. They contain no admixture whatever, and do not crumble or harden with time. They are made with the purest of drugs, and their action can always be relied upon with absolute certainty.

LIST OF "TABLOIDS."

Ammon. Bromide, 5 and 10 gr.
Ammon. Chloride, 3, 5 and 10 gr.
Ammon. Chloride with Borax.
Antifebrin, 2 gr.
Antipyrin, 5 gr.
Bismuth Sub-nit., 5 and 10 gr.
Caffein Citrate, 1 gr.
Cascara Sagrada Ext., 2 gr.
Cathartic Comp. U. S. P.
Charcoal, 5 gr.
Chloral Hydrate, 5 gr.
Chloramine.
Cinchonidia Salicylate, 2 gr.
Cocaine with Potash and Borax.
Ipecac. and Opium (Dover Powd.), 5 gr.
Ipecac. Powder, 5 gr.
Iron and Quinine Cit., 3 gr.
Laxative Vegetable.
Lithia Carbonate, 2 gr.
Manganese Dioxide, 2 gr.
Nitro-Glycerine.
Pepsin, Pure (Fairchild).
Pepsin Saccharated, 5 gr.
Peptonic.
Potash Bicarb., 5 gr.
Potash Chlorate, 5 gr.
Potash Chlorate with Borax, 5 gr.
Potash Nit. (*Sal Prunella*), 5 gr.
Potash Permanganate, 1 and 2 gr.
Potassium Bromide, 5 and 10 gr.
Potassium Iodide, 5 gr.
Quinine, ½, 1, 2, 3 and 5 gr.
Quinine Sulph., 1 gr.; Ferri Redact., 1 gr.; Arsenic, 1 20 gr.; Strychnia, 1/30 gr.
Quinine Sulph., 1 gr.; Arsenic, 1/20 gr.; Strychnine, 1/30 gr.
Rhei Comp., 3 gr.
Rhei and Magnesia, 5 gr.
Rhei and Soda, 5 gr.
Rhubarb, 3 gr.
Saccharin, ½ gr.
Salol, 5 gr.
Soda Bicarbonate, 5 gr.
Soda Chlorate, 5 gr.
Soda Chlorate and Borax, 5 gr.
Soda-Mint.
Soda Salicylate, 3 and 5 gr.
Soda Sulpho-carbolate, 5 gr.
Sodium Bromide, 5 and 10 gr.
Sodium Iodide, 5 gr.
Strophanthus, 2 minims of Tinct. in each.
Sulphonal, 5 gr.
Tannin.
Test Tabloids.
Tonic Comp: Fer. Pyrophos., 2 gr.; Quinine, 1 gr.; Strychnine, 1/100 gr.
Trinitrine (*Nitro-glycerine*), 1/100 and 1/50.
Trinitrine and Amyl Nitrite.
Trinitrine Comp: Trinitrine, 1/100 gr.; Nitrite of Amyl, ¼ gr; Capsicum, 1/50 gr.; Menthol, 1/50 gr.
Urethane, 5 gr.
Voice (Potash, Borax and Cocaine).
Zinc Sulph., 1 gr.
Zinc Sulpho-carbolate, 2 gr.
Zymine Tabloids.
Zymine Comp. Tabloids.

Morocco Case, No. 15, containing 10 3-drachm vials. Price, empty, 10s.; filled with Tabloids, 20s.

Calf Case, No. 17, containing 16 3-drachm vials. Price, empty, 14s.; filled with Tabloids, 25s.

Hypodermic Pocket Case.

Equipped with a Hypodermic Pocket Case, the physician has a more complete armamentarium for procedure in emergencies than is elsewhere procurable. The Hypodermic Tabloids are soluble, of uniform activity, and keep perfectly. In solution, whether prepared with an antiseptic or not, most of the active principles quickly undergo change. All the alkaloids and glucocides are perfectly preserved in the tabloids, and may be quickly dissolved as required.

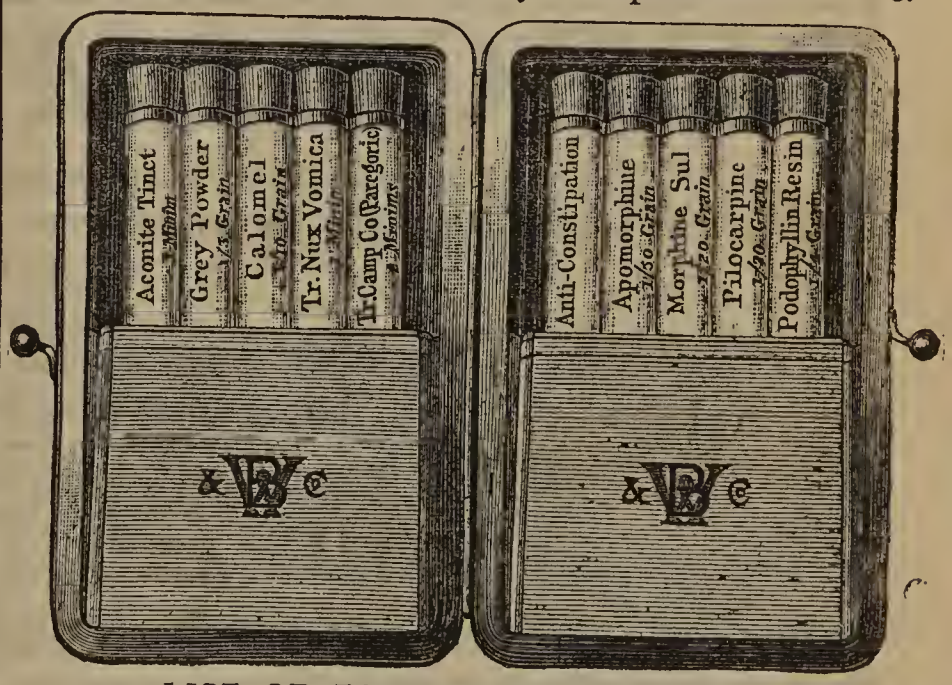
LIST OF HYPODERMIC TABLOIDS.

Aconitin .. .. .. 1-260 gr.
Aloin .. .. ½ gr.
Apomorphine .. 1-15 and 1-10 gr.
Atropin Sulph. 1-150, 1-100 and 1-60 gr.
Caffein Sodio-Salicylate .. 1-2 gr.
Codein Phosphate .. .. 1-4 gr.
Cocaine .. 1-6 gr. and 1-2 gr
Colchicin .. .. .. 1-100 gr.
Cornutin .. .. .. 1-60 gr.
Curare .. .. .. 1-12 gr.
Digitalin .. .. .. 1-100 gr.
Ergotinin .. 1-150 gr. and 1-300 gr.
Eserin .. .. .. 1-100 gr.
Homatropin (unirritating) .. 1-250 gr.
Hydrarg. Perchlor. 1-60 and 1-30 gr.
Hyoscyamin .. .. 1-80 and 1-10 gr.
Hyoscine .. 1-200 and 1-75 gr.
Morphine Bi-Meconate 1-8, 1-6, 1-4, and 1-3 gr.
Morphine Sulphate 1-12, 1-8, 1-6, 1-4, 1-3 and 1-2 gr.
Morphine and Atropin combinations.
Pilocarpin .. 1-10, 1-3 and 1-2 gr.
Quinine Hydrobromate .. 1-2 gr.
Sclerotinic Acid .. 1-2 and 1 gr.
Strophanthin .. .. 1-500 gr.
Strychnine 1-150, 1-100 and 1-60 gr.

Hypodermic "Tabloids" of the principal drugs and alkaloids supplied to the trade in tubes, containing from 12 to 20 Tabloids, at 12s. per doz. tubes. Send for list of Hypodermic Pocket Cases.

Cases of "Tabloid Triturates."

The Tabloid Triturates are made by compressing a small, uniform and appreciable dose of medicine, triturated with sugar of milk, into lenticular form. Brunton has pointed out that this method of giving medicine has **"the very great advantage that the desired effect can be produced with greater certainty and with less risk of an overdose being taken."** The Tabloids of Triturated Drugs are easier to swallow than pills, and as the sugar of milk will dissolve as soon as it enters the stomach, they are certain to be disintegrated at once. They are pleasant to take.



LIST OF TABLOID TRITURATES.

Price to the trade. 8s. 6d. per doz. bottles of 100 of the following Tabloid Triturates. Retail price, 1s. each.

Aconite Tinct. .. .. 1 min.
Arsenious Acid 1/100 and 1/50 gr.
Belladonna Tinct. .. . 1 min.
Calcium Sulphide .. .. 1/10 gr.
Capsicum Tinct. .. .. 1 min.
Digitalis Tinct. .. .. 1 min.
Hydrarg. Perchlor. .. .. 1/100 gr.
Hydrarg: Cum Cretæ (Grey Powder) 1/3 gr.
Hydrarg. Subchlor. (Calomel) 1/10 gr.
Hyoscyamus Tinct. .. .. 1 min.
Nux Vomica Tinct. .. .. 1 min.
Tinct. Camph. Co. (Paregoric) 2 min.

Price to the trade, 8s. 6d. per doz. bottles of 50 of the following Tabloid Triturates. Retail price, 1s. each.

Anti-Constipation { Aloin 1-5 gr. Strych. 1-60 gr: Belladon, Ex. 1-8 gr. Ipecac 1-16 gr
Apomorphine Mur. .. .. 1/50 gr.
Atropin Sulph. .. .. 1/100 gr.
Digitalin .. .. .. 1/100 gr.
Euonymin Resin .. .. 1/8 gr.
Hydrarg. Iod. Rub. .. .. 1/20 gr.
Hydrarg Iod. Vir. .. .. 1/8 gr.
Morphine Sulph. .. 1/20 and 1/8 gr.
Opium Tinct. (Laudanum) 2 min.
Pilocarpin Mur. .. .. 1/20 gr.
Podophyllin Resin .. .. 1/4 gr.
Santonin .. .. .. 1/2 gr.
Strophanthus Tinct. .. 2 min

Leather Pocket Case, arranged to contain 10 Tubes Tabloid Triturates, 1s. 6d. empty; filled 5s.

Leather Pocket Case, arranged to contain 16 Tubes Tabloid Triturates, 2s. 6d. empty; filled 8s. 6d.

Above prices subject to usual discount.

BURROUGHS, WELLCOME & CO., Snow Hill Buildings, LONDON, E.C.

IMPROVED SYRINGES

FOR THE

INJECTION OF GLYCERINE

TO RELIEVE CONSTIPATION.

Prices to the Trade: { **PEWTER, 8/- per doz.; PEWTER, with Glass Barrel, 12/- per doz.; VULCANITE, 30/- per doz.; VULCANITE, with Glass Barrel, 30/- per doz.; CELLULOID, with Glass Barrel, 42/- per doz.**

S. MAW, SON & THOMPSON, ALDERSGATE STREET, LONDON.

PUMILINE

The only Pure Essence and Extract of Snow-grown Pumilio Pines.

FOR GOUT, RHEUMATISM, BRONCHITIS, SORE THROATS, AND CHEST AFFECTIONS.

THE SNOW-GROWN PINUS PUMILIO.

Sir MORELL MACKENZIE wrote, December 9, 1887.

"I have much pleasure in stating that I have made use of Oleum Pumilionis during the last twenty-five years, and that I consider it a most valuable preparation. It acts as an admirable tonic to the mucous membrane of the air passages in cases of chronic bronchitis and laryngeal catarrh. I am glad, therefore, to hear that the remedy is about to be used on a large scale, and I have no doubt the results will be highly satisfactory." (Signed) MORELL MACKENZIE, M.D.

Pumiline ALONE, with the single exception of Pinol, possesses the physical and chemical properties which give it the faculty of being administered with SAFETY. It is therefore essential for Chemists to use Pumiline, as it is the only preparation obtained from snow-grown Pumilio Pines.

For Trade Price Lists, Pamphlets, Analytical Reports, &c.,

G. & G. STERN, 11, BILLITER SQUARE, LONDON, E.C.

BEECHAM'S PILLS.

TRADE MARK.

The most Marvellous Medicine of the Age for Bilious and Nervous Disorders, Indigestion, and Female Complaints.

The Demand is unprecedented, and the Sale is by far the Largest of any Patent Medicine in the World.

Prepared only, and Sold Wholesale and Retail, by

THOMAS BEECHAM,

ST. HELENS, LANCASHIRE, ENGLAND.

TRADE MARK

SAVARESSE'S CAPSULES SANDAL WOOD; COPAIBA.

Savaresse's Capsules of membrane, each containing 15 drops Pure Maranham Copaiba Balsam, or, also of membrane, each containing 10 drops Purest Yellow Sandal Wood Oil. The efficacy of these valuable medicines is due to the absolute purity of the Balsam or Oil, and to the very gradual solvability of the membrane as compared with gelatine.

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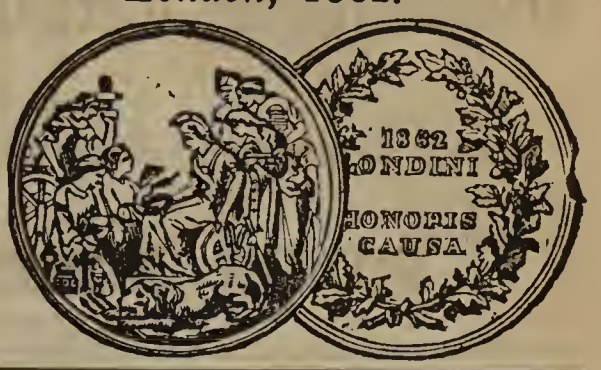

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NAME.	Per Dozen.		Original Packages.			
	Bots.	½ Bots	Bottles.		½ Bottles	
Æsculap	15/	12/	25	2?/	50	48/
Alet	10/	..	50	38/	..	..
Apollinaris	6/3	5/	50	25/	100	39/
Birmensdorf	12/	..	50	48/	..	..
Bonnes	12/	10/	50	48/	50	40/
Bourboule (La)	11/	..	50	42/	..	..
Bussang	7/	..	50	28/	..	..
Carlsbad	10/	..	50	40/	..	..
Condal	..	14/	..	..	50	56/
Contrexeville "Le Cler"	8/	..	50	32/	..	..
Do. "Pavilion"	9/	..	50	35/	..	..
Ems	7/	..	50	28/	..	..
Flitwick	12/	..	..	..	..	..
Friedrichshall	13/	10/	25	25/	50	40/
Glesshubler, double-size bottles	11/	..	25	21/	..	..
Do. claret-shape ,,	8/	5/	50	29/	100	36/
Homburg	10/	..	50	38/	..	..
Hunyadi-Janos	15/	13/	25	30/	50	50/
Johannis-Brunnen	6/	5/	50	23/	100	36/
Kissengen	11/	..	50	45/	..	..
Kreuznach	11/	..	50	45/	..	..
Kronenquelle	10/	..	50	40/	..	..
Marienbad	10/	..	50	38/	..	..

NAME.	Per Dozen.		Original Packages			
	Bots.	½ Bots	Bottles.		½ Bottles	
Missisquoi	18/	..	24	35/	..	..
Mont Dore	16/	..	50	40/	..	..
Oberbrunnen	10/	..	50	40/	..	..
Orezza	12/	..	30	28/	..	..
Pullna	12/	8/	40	36	40	25/
Roisdorf	6/	..	50	25/	..	..
Rosbach	6/	5/	50	24/	100	36/
Royat	9/	..	50	34	..	..
Rubinat	15/	..	25	30/	..	..
St. Boës	12/	..	50	48/	..	..
St. Galmier Badoit (Still)	6/	..	50	22/	..	..
Do. Noël (Sparkling)	6/	4/	60	26/	100	34/
St Moritz	12/	..	50	48/	..	..
Salvator	..	9/	..	..	50	36/
Schwalbach	8/	6/	50	30/	50	24/
Selters	6/	4/	50	23/	50	16/
Sulis	6/	5/	50	23/	100	36/
Tarasp	12/	..	30	28/	..	..
Taunus	5/6	4/6	50	22/	100	32/
Vals (Société Springs)	8/6	..	50	32/	..	..
Vichy (State Springs)	8/6	7/6	50	32/	50	28/
Victoria Ofner	14/	10/	25	27/	50	38/
Wildungen	10/	..	50	40/	..	..

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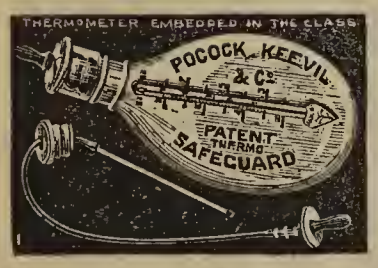

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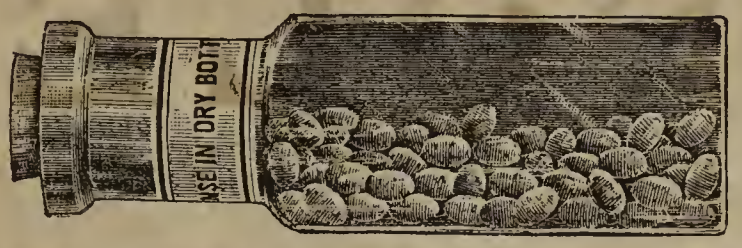
EXACT  SIZE.

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DOSE.—One pill three times a day. Morning, noon, and night. Where a painless peristaltic action is desired by the aged or female patient, one pill may be taken every night or second night at bedtime, as directed by medical attendant.

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"*These Tonic Laxation Pills can be taken with advantage in those cases* (*mainly female*) *where tonics alone set up strangury from their action upon the vesical centres in the spinal cord.*"

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In this form the ingredients are not only perfectly preserved, but do not affect the teeth, or offend the palate, and, further, can be conveniently kept out of sight by those who object to be regarded as invalids. Complete list mailed free on application. PLEASE SPECIFY McK. & R. PILLS.

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New Mercurial Compounds.

Some interesting information has been published as to the behaviour of salicylate of mercury with caustic soda and with halogen alkali salts (*Pharm. Centralh.*, July 19, p. 354). The mercuric salicylate is readily dissolved by soda solution without residue in the proportion of a molecule of salicylate for each molecule of caustic soda used; or if concentrated hot solutions of the two compounds be mixed in equivalent proportions a double salt, represented by the formula $C_6H_4\begin{cases}COOHgOH,\\ ONa\end{cases}$ crystallizes out in short prisms. By a hot solution of carbonate of soda salicylate of mercury is dissolved with a slight evolution of carbonic acid. When treated with aqueous solutions of the halogen salts of the alkalies it swells up like a jelly; but when heat is applied solutions are formed from which upon cooling double salts separate, having the composition represented by the typical formula $C_6H_4\begin{cases}COO—Hg—Cl\\ ONa\end{cases}$, the mercury being in combination with both the salicylic and the halogen radicles. These salts dissolve in water only imperfectly and under partial decomposition, but are soluble in the presence of a certain quantity of halogen salt. Salicylate of mercury therefore resembles the albuminate in its solubility in solution of chloride of sodium and has been recommended for use in the place of perchloride of mercury in the antiseptic treatment of wounds.

Mercuric Oxycyanide and Cyanide.

The results of some comparative experiments as to the antiseptic properties of oxycyanide, cyanide and perchloride of mercury are reported by M. Chibret (*Compt. Rend.*, cvii., 119). Solutions of the oxycyanide have a slightly alkaline reaction and only precipitate albumen very slightly. They are said to be less irritating to the tissues than solutions of the perchloride, one of the strength of 1 in 1500 being well tolerated by the mucous membrane and by wounds. Oxycyanide solutions also appear to be absorbed to a less degree by the tissues than those of perchloride and a 1 in 1500 solution does not attack seriously the metals of surgical instruments. Added to a peptonized broth the antiseptic power of the oxycyanide of mercury proved to be six times as great as that shown by the perchloride, a 1 in 12000 solution of the oxycyanide preserving the broth equally with a 1 in 2000 solution of corrosive sublimate. In its effect upon *Micrococcus aureus* a 1 in 1300 solution of oxycyanide equalled a 1 in 1400 solution of perchloride, and the cyanide was slightly less active than the oxycyanide. In M. Chibert's opinion, when employed in surgery upon suppurating surfaces or to render the mucous membrane aseptic, and particularly the conjunctiva, a 1 in 1500 solution of oxycyanide of mercury allows of the production of an asepsis superior to that obtained with corrosive sublimate, because of the tolerance shown towards it by the tissues on account of its slight absorbability.

Morphine Hydrate.

It will be remembered that recently, in this Journal (Feb. 25, p. 701), Mr. Dott affirmed that morphine loses all its combined water at 90° C., contrary to most published statements which fixed the temperature required at above 100° C.; he also represented the quantity of the combined water as nine molecules to eight molecules of alkaloid. Subsequently (March 24, p. 801), Dr. Hesse confirmed the statement as to the loss of the water at a temperature below 100° C., but questioned the accuracy of the formula $8C_{17}H_{19}NO_3+9H_2O$ suggested by Mr. Dott, on the ground that his own experiments had shown that the amount of water of crystallization was exactly one molecule for each molecule of alkaloid. More recently (*Pharm. Centralh.*, June 28, p. 317) Herr Dieterich gives as follows the results of his observations of the loss of water in the drying for successive periods of three hours each at different temperatures of morphine that had previously been dried for eight days at a temperature of 25° to 30° C. Heated for three hours at 40° C. the loss was *nil*; at 60° the loss was 0·20 per cent.; at 80° it was 3·36 per cent.; at 100° it was 2·63 per cent.; and at 120° it was 0·20 per cent.; the total loss being 6·39 per cent. Herr Dieterich refers to the larger loss observed by Mr. Dott (average 6·56 per cent.) as probably due to the use of morphine that had not been previously dried for eight days, but he points out that his results so far confirm Mr. Dott's that the loss of water noted by himself was in excess of the quantity corresponding to one molecule to each molecule of alkaloid (5·94 per cent.). In the *Pharmaceutische Zeitung* (July 21, p. 421) the question is raised whether Herr Dieterich's experiments were made with absolutely pure morphine or with a product obtained in the determination of the morphine strength of opium by the Helfenberg process.

Terpenes and Essential Oils.

In an eighth contribution to our knowledge of terpenes and the essential oils (*Annalen*, ccxlvi., 224) Professor Wallach records several very interesting observations. In examining the essential oil obtained from the needles of *Pinus sylvestris* he found that it contained a terpene identical in every respect with ordinary limonene (citrene), contained in oil of bitter orange peel, oil of caraway and other essential oils, except that it rotated polarized light to the left, whilst limonene as previously known was dextrogyre. He therefore calls this newly observed compound "left-handed limonene." The derivatives of the left- and right-handed limonenes were also found to be identical in chemical composition, but physical isomers, the nitrosochloride of the left-handed limonene being dextrogyre, whilst that of the right-handed one, as ascertained by Tilden, is lævogyre. Upon mixing together small quantities of the two modifications of limonene, dipentene was formed, a hydrocarbon of which the relationship had not been hitherto recognised. It had been previously stated that the nitroso derivatives of carvol, known as carvoxims, whether prepared by Tilden's or by Goldschmidt's methods, were chemically identical, but physical isomers with opposite rotatory powers. It was now found that upon mixing equal quantities of these two carvoxims, a compound was obtained identical with "nitrosodipentene," except that it was optically inactive. Another active terpene, phellandrene, was only known to occur in a right-handed form in the essential oils of *Phellandrium aquaticum* and bitter fennel. It has now been ascertained to occur also in elemi oil and a left-handed modification has been found in oil of *Eucalyptus amygdalina*. The nitrite of the right-handed phellandrene is strongly lævogyre, whilst that of the

left-handed phellandrene is dextrogyre; a mixture of the two modifications yields an optically inactive substance which corresponds in other respects with its constituents. Professor Wallach then discusses in a most interesting manner the relations that may obtain between the terpenes in the plant economy. Both pinene and limonene are now known to be convertible into dipentene, and it seems probable that limonene forms an intermediate stage between pinene and dipentene. If the pinene first takes up the elements of water to form terpin hydrate, and then loses them to form dipentene (*i.e.*, a mixture of + and − limonene), then these changes might be expected to take place in those parts of the plant where the pinene comes into contact with acids. The principal acid-building organs are the leaves, flowers, young internodes, etc. It can therefore easily be understood how it is that in the stems of the Coniferæ pinene is found almost exclusively, and in the acid-containing needles limonene occurs together with pinene, whilst in the acid fruits of the Aurantiaceæ the limonene gets the upper hand.

Oil of Bay.

In the United States Pharmacopœia the specific gravity of oil of bay (*Oleum Myrciæ*) is given as about 1·040. Messrs. Dodge and Olcott, writing to the *Druggists' Circular* (July, p. 156), state that for the past eight years they have probably been the largest distillers of the oil in the world, but that they have never seen a sample that had so high a specific gravity as that prescribed officially. In distilling the article they have found the specific gravity of the first of a distillate to be 0·895 and that of the last 1·020, whilst a fair bulking sample of a complete distillation would have a specific gravity of 0·965 at 60° F. In addition the U.S.P. speaks of the oil as having a "somewhat clove-like odour," a statement that taken in conjunction with that respecting the specific gravity leads Messrs. Dodge and Olcott to infer that the sample examined by the person who compiled the official description could not have consisted entirely of oil of bay.

Apiol and Isapiol.

As the result of heating apiol, the so-called parsley camphor, with alcoholic potash, Messrs. Ciamician and Silber have obtained a crystalline compound having the same composition as apiol ($C_{12}H_{14}O_4$) which they have therefore named "isapiol" (*Ber.*, xxi., 1622). It melts at 55–56° (apiol melts at 30°) and is soluble in ether, acetic ether, acetone, benzol, hot alcohol and glacial acetic acid, but insoluble in water, alkalies and carbonated alkalies. Both apiol and isapiol yield upon oxidation with potassium permanganate in alkaline solution a crystalline acid represented by the formula $C_{10}H_{10}O_6$ and named "apiolic acid;" but isapiol, when oxidized with potassium bichromate and sulphuric acid yields a neutral compound ($C_{10}H_{10}O_5$). Isapiol has been tested physiologically and therapeutically in the Padua clinic, and is reported to exercise a pronounced influence upon the vaso-motor system. Small doses (0·2 to 0·4 gram), administered internally, produced in half an hour excitation of the heart, with powerful pulse; larger doses (0·6 to 0·8 gram) were followed by a rebounding pulse, the effect continuing for several days after administration, when the preparation had been previously used for some days. Like apiol, isapiol induced headache and passing intoxication, and after repeated ingestion caused digestive disturbances, loss of appetite and even fever. Against dysmenorrhœa it was useless and also in a case of ague.

Camphor, Menthon and Borneol.

Some time since reference was made to an interesting communication from Dr. Beckman upon the conversion of menthon, the liquid constituent of peppermint oil, into menthol, and of laurel camphor into borneol (vol. xvii., 277). Dr. Beckman now definitely describes a process for carrying out these operations upon a manufacturing scale (*Pharm. Zeit.*, July 21, p. 422). The camphor (or in the case of menthon the peppermint oil containing it) is dissolved in ether or some other solvent indifferent to the action of sodium and repeatedly treated with sodium and then with water. The reaction with camphor is shown by the equation:—

$$\underset{\text{Camphor.}}{2C_{10}H_{16}O} + Na = \underset{\text{Sodium Camphor.}}{C_{10}H_{15}NaO} + \underset{\text{Sodium Borneol.}}{C_{10}H_{17}NaO}.$$

These sodium compounds are decomposed by water with the formation of molecular quantities of camphor and borneol:

$$C_{10}H_{15}NaO + C_{10}H_{17}NaO + 2H_2O = C_{10}H_{16}O + C_{10}H_{18}O + 2NaOH.$$

The solution of camphor and borneol so obtained is treated afresh with sodium and water until all the camphor is converted into borneol.

Wool Fat.

Under the name "lanesin" a preparation of wool fat has been introduced, which is made by a process varying in some respects from that hitherto adopted (*Pharm. Zeit.*, July 21, p. 421). The suint obtained from the wool-washing liquor by precipitation with lime is purified, whilst in a pasty and alkaline condition, by treatment with alkaline oxidizing agents, such as manganates or permanganates of the alkalies, or solution of chloride of lime. Afterwards by extraction of the dried mass a pure neutral wool-fat is obtained, consisting of cholesterin, isocholesterin, etc. In order to convert the harder samples of this wool-fat into the softer unctuous condition suitable for pharmaceutical and cosmetic purposes, instead of adding soft fats, oils or vaselin, the ethyl or methyl ether of oleic acid or ricinoleic acid is used. For the decomposition of the residue containing the lime soap, in order to separate the fat acids, sulphuric acid of such concentration is used as to produce at once a dry mass suitable without further treatment for extraction by suitable solvents.

Leucomaines in Cod Liver Oil.

The occurrence of choline in cod liver oil has been long known, but Messrs. Gautier and Mourgues report that they have succeeded in separating from pale yellow Newfoundland and Norwegian oils a number of other bases, some of which are very active physiologically and may play an important part in the therapeutic action of this remedy (*Compt. Rend.*, cvii., 110). The oil was first treated with an equal volume of 33 per cent. alcohol containing 4 grams of oxalic acid per litre, the alcoholic liquid siphoned off, neutralized exactly with lime, filtered and distilled in a vacuum. The distillate was allowed to stand over precipitated carbonate of lime, the neutral liquor evaporated to dryness in a vacuum, the residue taken up with hot alcohol, the solution distilled and the residue taken up with a little water and saturated with caustic potash. The liquor was then exhausted with plenty of ether, which removed the alkaloids. These were precipi-

tated by oxalic acid, and the oxalates upon being decomposed with potash yielded a thick, brown, very alkaline oil, amounting to about 0·35 to 0·50 gram of the dry alkaloids from a kilogram of oil. This mixture of bases was submitted to fractional distillation and the products so separated were :—(1) butylamine, boiling between 87° and 90° C.; (2) amylamine, between 96° and 98°; (3) hexylamine, a little above 100°; (4) hydrolutidine, a new base, between 198° and 200°; (5) aselline, a new fixed base, giving a hydrochlorate immediately precipitated in the cold ; and (6) morrhuine, another new fixed base, giving a rather soluble chloroplatinate which crystallizes from the mother liquor of the preceding. Besides these there were observed in cod liver oil a little lecithine, a peculiar nitrogen acid that has been named "gaduinic acid," a rather powerful acid, and an alkaloid giving crystallizable chloroplatinates.

Ricin.

The well-known poisonous properties of castor oil seeds, when eaten, have at length been explained by Dr. H. Stillmark, who has been working at the subject of the toxic principle of the seeds in Professor Kobert's laboratory. He has discovered in them an albuminoid body which he has named "ricin," and classes amongst the "unformed ferments." This, however, does not appear to be the purgative principle. Its action, whether given by mouth or hypodermically, is to produce hæmorrhagic inflammation of the gastro-intestinal tract, affecting primarily the small intestine and probably obstructing the bile duct, since there is usually extreme fulness of the gall bladder; the inflammation also extends to the vesical mucous membrane. Diarrhœa is by no means constant. The drowsiness and convulsions which occurred in some of his experiments on animals he attributes to possible thrombosis of the cerebral vessels. The lethal dose of ricin for man he calculates to be 6·0 milligrams for a man weighing 60 kilograms, this quantity being equal to about ten ordinary seeds, although Christison once had a fatal case where only three seeds had been swallowed, and on the other hand a case is on record in which a person who had eaten seventeen seeds recovered. Ricin appears to have a peculiar effect upon blood, causing a rapid conglomeration of the red corpuscles, together with the formation of a substance like fibrin. One part of ricin to 60,000 of defibrinated blood is sufficient to cause a separation of the serum, so that the latter is capable of being passed through a filter. Crotonoleic acid, which exists in croton seeds, was found to be quite distinct from ricin. The results obtained by the experiments of Dr. Stillmark find further confirmation in a note in the *Medical Recorder* (July, p. 299), in which it is stated that fifteen children under six years of age, poisoned by eating castor oil seeds, suffered from severe vomiting and prostration, but not from catharsis. An interesting note on the effect of croton oil seeds may be found in a former volume of the *Pharmaceutical Journal* ([3], vol. viii., p. 719).

Vegetable Rennet.

Under the heading "vegetable rennet" an article is contributed to *Nature* (July 19, p. 275) by Professor J. R. Green, whose position as lecturer on botany to the Pharmaceutical Society has doubtless to some extent directed his attention to the biological aspect of plant products having a bearing upon pharmacy. He points out the similarity between the protoplasm of animals and plants, comparing starch with glycogen, and the proteid bodies long known to exist in animals, and classed as albumins, globulins, albumones and peptones with similar or parallel products met with in vegetables. The animal ferments, such as pepsin, trypsin and the pancreatic ferments, he likens to the diastase, papain and other similar ferments found in the vegetable kingdom. He carries the parallel further by comparing leucin in the animal with asparagin in the vegetable kingdom, and the alkaloid cadaverine found in putrefying animal matter with muscarine found in several species of *Agaricus*. He points out that the list of these bodies occurring in the vegetable kingdom is constantly increasing, conspicuous examples being furnished by the *Ranunculaceæ* (*Clematis Vitalba*), *Solanaceæ*, *Cucurbitaceæ*, *Compositæ* (*Cynara Scolymus*), *Galiaceæ* (*Galium verum*) *Lentibulariaceæ* and others. He considers the occurrence of a ferment having the power of coagulating milk in *Pinguicula* as especially interesting, since the plant is at the same time carnivorous, so that there is here an instance of the occurrence in the same individual of a proteolytic and a rennet ferment, a condition which at once recalls the gastric juice of animals, in which both these bodies are present. Two of the most recently noted plants containing a rennet-like ferment are: (1) *Acanthosicyos horrida* (Cucurbitaceæ), a native of Africa, in which the ferment is contained in the juice, pulp, and rind of the ripe fruit, but has not been detected in the unripe fruit, is destroyed by boiling but not by drying in the sun, and is soluble in 60 per cent. alcohol and in a 5 per cent. solution of common salt; and (2) *Withania somnifera*, a native of northern India, in which plant the ferment is most abundant in the seeds, and is soluble in solution of salt and in glycerine. Professor Green has recently determined the presence of a similar ferment in the unripe seeds of *Datura Stramonium*, but curiously enough it appears to be absent from the ripe seeds. The use of these ferments to the plant is as yet not clearly understood. Professor Green remarks that the occurrence of the ferments in those parts of plants which are especially connected with reproduction seem to point to a possible function in connection with the storage of proteid food material for the nutrition of the embryo during germination.

Peptonic Fermentation.

In a communication sent to the French Academy of Sciences in November, 1884, by M. Marcano, "peptonic fermentation" was recommended as the best means of converting muscular fibrin into pure peptone, and since that time the suggestion has received practical application. In the original note it was stated that if agave juice were added to the chopped meat the fermentation would require thirty-six hours for its completion. M. Montano now reports (*Compt. Rend.*, cvii., 117) that experience has shown that if the tissues of the plant from which the juice has been previously expressed be added to the meat at the same time as the juice the solution of the fibrin is effected in five or six hours, with the formation of 20 per cent. of peptone, or nearly the theoretical yield. Further, if minced meat be mixed with agave tissue to which its juice has been restored, without any water, and the containing vessel be kept at a temperature of 35° C., the mass swells gradually, and in the small quantity of liquor that drains

from it only a small proportion of peptone can be detected, even after three or four hours. But if water be added to the magma and the temperature raised until it reaches 70° C., the whole liquefies almost instantaneously, yielding a concentrated solution of peptone that gives no precipitate with yellow prussiate of potash. The explanation is that under the initial conditions a pepsin is developed which forms with the fibrin a compound insoluble at the lower temperature, but which is dissolved by a sufficient quantity of water at 70° C. If the tissue be boiled before being mixed with the meat and its own juice the conversion of fibrin into peptone is very much diminished.

Soja Bread.

In a recent communication to the Société de Médecine Pratique (*Archives*, July 5, p. 290), M. Lecerf, after calling attention to the nutritive value of the seeds of *Soja hispida*, which he described as exceeding that of the lean of beef, suggested that as a flour prepared from them would be rich in proteids and phosphoric acid and would contain only about 3¼ per cent. of amylaceous and saccharine matters, it might be employed advantageously in the preparation of bread and biscuits intended for diabetic patients. A sample of bread prepared from this flour was, in fact, exhibited a short time since by Dr. Dujardin-Beaumetz at the Académie de Médecine, and it was stated to remain fresh for four or five days. It has since, however, been pointed out by M. Petit that soja seeds contain an oil possessing rather energetic purgative properties, 10 grams being sufficient for a dose, and that unless this oil were removed from the seeds before they were ground its presence in the flour would render it unsuitable for alimentary purposes.

Lycopodium Spores.

The constituents of the spores of *Lycopodium clavatum* form the subject of a communication from Herr Langer (*Chem. Zeit.*, July 8, p. 912). A commercial sample contained 93 per cent. of pure dried spores, and yielded 1·555 per cent. of neutral ash, consisting principally of phosphates of potassium, sodium, calcium, magnesium, iron and aluminium, with small quantities of chlorides, sulphates and silica. The ash contained 45·17 per cent. of phosphoric acid and only traces of manganese. The ready inflammability of the spores, and their resistance to moisture, are attributed to an oil having an acid reaction, which was found present to the extent of 49·34 per cent. This agrees pretty well with the quantity reported by Flückiger and Hanbury, 47 per cent., but Bucholz placed it as low as 6 per cent. This oil is easily altered by atmospheric oxygen, becoming turbid and separating a crumbling unctious mass, and the oxidation probably goes on in the spores when kept. The oil contains 80–86·7 per cent. of α-decyl-β-isopropylacrylic acid, besides solid fat acid, probably consisting principally of myristic acid. The glycerine found varied from 2·8 to 5·2 per cent. Herr Langer thinks it probable that the oil from fresh spores would be neutral. Besides the foregoing constituents 2·1 per cent. of cane sugar was found, and the nitrogen amounted to 0·857 per cent. Upon warming the spores with potash solution, methylamine was given off, and upon fusing caustic potash with them a small quantity of a white crystalline benzol compound was formed that was coloured red-brown by ammonia, and appeared capable of being used as an indicator. Lastly, the curious observation was made that alcohol with which the spores were left in contact for fourteen days in a loosely-closed vessel was oxidized to aldehyd.

Mineral Constituents in Trees.

An interesting investigation, undertaken to determine the distribution of mineral constituents in trees, is reported by Herr Weber (*Bot. Centralh.*, xxxii., 314). Transverse slices taken at intervals of five metres along the trunk of a beech tree one hundred and fifty years old were divided so that each portion corresponded to thirty annual ligneous rings and these were analysed. The yield of ash from zones of wood of the same age was found to increase regularly from the base of the trunk to the summit. Passing in from the circumference to the centre of a section taken towards the base of the trunk, each successive portion yielded a larger quantity of ash until a certain limit was reached, after which the yield of ash progressively decreased; but the increase in the yield of ash from sections taken higher up the trunk was continuous from the periphery to the centre. The composition of the ash also varied, the proportion of potash, which was 23 per cent. in that yielded by the outermost portions of the wood, increasing to 43 per cent. in the ash yielded by the central portions, whilst, on the contrary, magnesia fell in going from the circumference to the centre from 29 to 11 per cent., phosphoric acid from 8 to 2 per cent., and sulphuric acid in the same direction. The bark was much richer in mineral constituents than the wood, lime being the predominant constituent and forming 82 per cent. of the ash.

Indian Gums.

The Indian gums such as have appeared in commerce during the last four years are usually tolerably white, but they are not very soluble in water, even with heat, the effect being rather that they swell up like cerasin. For this reason they have been considered unavailable as thickening material and for other industrial purposes. Herr Meyer reports, however (*Chem. Repert.*, July 15, p. 203), that since 1885 he has been using large quantities of solution of Indian gum containing 200 grams of gum to the kilogram, which he has prepared by boiling together 20 kilos of gum and 65 kilos of water for half-an-hour in an autoclave under a pressure of one atmosphere, and then diluting with sufficient water to make 100 kilos. So treated the Indian gum is said to be capable of doing more service as a thickening material than Senegal or Ghezireh gum, 100 parts of Indian gum being equal in this respect to 190 parts of Ghezireh gum. It is noteworthy that a solution of Indian gum prepared by this method, if evaporated at a temperature of 45° or 50° C., becomes again insoluble; it then simply swells up in contact with water, even at a boiling temperature.

Ipecacuanha.

In the *Archiv der Pharmacie* (May 31, p. 432) Messrs. Tschirch and Lüdtke report upon the examination of thirty-two specimens obtained from various sources under the name "ipecacuanha root." For convenience the authors divide them into two principal groups, which are again subdivided as follows:—(I.) The woody bundles contain only tracheides and no vessels: (1) roots contain emetine; (2) roots contain no emetine. (II.) The woody bundles contain vessels; emetine absent: (3) bark without stone-

cell groups; (4) bark with stone-cell groups; (5) bark contains inulin. The official ipecacuanha belongs to the first of these subdivisions, and the authors give the following description of a genuine ipecacuanha suitable for use in medicine. It should be of a grey-brown colour, and the woody bundles should contain neither vessels nor medullary rays, but besides genuine tracheides only other tracheides resembling vessels and having lateral perforations. In the bark there should be no stone-cells, but an abundance of starch and of calcium oxalate in the form of bundles of raphides. Inulin should never be present. The smallest quantity of powder should give a distinct indication of emetine. The test recommended is to shake 0·5 gram of fine powder in a test-tube with 2·5 c.c. of hydrochloric acid (sp. gr. 1·12), and after an hour filter, when a drop or two of the liquor should give with a granule of chloride of lime the characteristic red colour.

Adulterated Liquorice.

As the result of the examination of a number of samples of "liquorice" or "spanish juice," based upon a comparison of the ash yielded with that obtained from samples believed to be genuine, Mr. B. Dyer is of opinion that liquorice is adulterated to an enormous extent (*Analyst*, July, p. 124). The sophisticated samples, so far as could be ascertained, appeared to be chiefly of French origin, the best samples coming from Italy. The genuine juices all contained a tolerably large quantity of starch, but this was readily distinguishable from the added starch, which was recognized in different samples as derived from wheat, barley, rice, potatoes and perhaps rye. The samples in which adulteration was detected by the microscope showed a very low yield of ash free from silica and clay; in four cases the quantity fell below 2 per cent., and in another case below 3 per cent., whilst that from presumably genuine specimens ranged between 3 and 5 per cent. Another difference observed was in the relative proportion of potash in the ash, which in that from genuine samples amounted to from 34 to 43 per cent., whilst in that from adulterated samples it was only 18 to 30 per cent. A sample made by Mr. Dyer, by evaporating a decoction of liquorice root, gave results that agreed well, as regards the quantity of ash and its composition, with those obtained from the commercial samples of reputed genuineness, except that the proportion of phosphoric acid in the former was much higher.

Acids and the Sense of Taste.

Some data compiled by Dr. Corin whilst experimenting upon the effect of acids on the sense of taste appear almost capable of being arranged in accordance with a definite law (*Pharm. Zeit.*, July 14, p. 418). He found that the intensity of the sour sensation produced by different acids of an equal degree of concentration was not the same; neither was it proportional to the amount of hydrogen replaceable by a metal. But with solutions that contained an equal amount of acid hydrogen the effect produced varied with the atomic weight, so that the acid taste was stronger in proportion as the molecular weight was lower. The intensity of the sour taste of a molecule of an acid would seem therefore to be connected with the relation of the acid hydrogen contained in the molecule to the weight of the molecule.

Lathyrus sativus.

Lathyrus sativus has long been known to be capable of producing toxic symptoms when used for a prolonged period, either by animals or human beings. This condition, known as lathyrismus, has been investigated by Dr. B. Suchard. The chief effect produced on the human subject is upon the muscles of the lower extremities, especially on those below the knee. In horses, also, paralysis of the hinder extremities takes place and death has followed from bilateral paralysis of the laryngeal recurrent nerves and consequent asphyxia. The laryngeal affection has not, however, been observed in the human subject. The toxic principle obtained from the seeds by Astier, was a volatile liquid alkaloid, and according to him is not present in preparations such as the pressed cake, which is made at a high temperature (*Lancet*, June 30, p. 312). It seems hardly probable, however, that the volatile alkaloid can exist in the free state; the effect produced by a high temperature seems to suggest that the alkaloid is produced by some proteid ferment whose action is destroyed by heat.

Fool's Parsley.

The poisonous or non-poisonous character of *Æthusa Cynapium* appears to be again open to discussion. Mr. E. Scott Sugden, of Birkenhead Borough Hospital, records in the *Lancet* (July 7, p. 16) the case of a young man aged nineteen who ate a few of the leaves of a plant he gathered by the hedgeside and thought to be tansy. These caused vomiting, nausea and headache, a burning sensation about the mouth and throat, dilated pupils and a quick and feeble pulse. The herb is stated to have been undoubtedly fool's parsley. That plant, however, is not usually found in hedgerows, but in gardens or waste ground.

Tannin in Tuberculosis.

At a recent medical congress in Italy Professor Ceccherelli bore testimony to the value of tannin in the treatment of tuberculosis (*Med. Pr. Circ.*, July 18, p. 68). He confirmed previous statements as to its antifermentative properties, and said that after watching the action of the compound in several cases of tubercular lesion he had come to the conclusion that it not only suspends the tubercular development, but also destroys the tubercular centres, and that in this respect it is far before iodoform.

Iodoform as a Hæmostatic.

Iodoform is recommended by Messrs. Chauvin and Jorisenne as a powerful reliable and rapid hæmostatic (*Med. Pr. Circ.*, July 18, p. 67). They administer it in pills containing one grain of iodoform made up with extract of gentian or liquorice, three to five being taken daily.

Tinct. Flor. Pyrethri as an Insecticide.

An old suggestion for the use of a strong alcoholic preparation in the place of the ordinary insect powders is revived by Herr Marpmann, who recommends the use of a tincture prepared by macerating one part of "insect powder" in twenty parts of 96 per cent. alcohol for eight days and then filtering (*Pharm. Centralh.*, July 12, p. 341). He says that if this tincture be sprayed in places infested by flies or other insects it will act similarly to the powder, whilst it only causes very slight irritation to the mucous membrane and leaves hardly any stain. When used in a chamber it is suggested that it should be combined with a little oil of lavender or some other perfume. This communication incidentally confirms the view that the toxic

action of "insect powder" is not due to the fineness of the powder, as has been alleged, but to a definite compound that is soluble in alcohol and very volatile. In fact a distillate from the flowers is said to have the same effect as a pure insect powder.

Food of the Myxomycetes.

In the *Annals of Botany* (July, p. 1) Mr. Arthur Lister contributes a very interesting article on the plasmodia of two species of myxomycetes, viz., *Badhamia utricularis* and *Brefeldia maxima*, which he kept under cultivation for twelve months. As the result of his experiments he finds that the first-named fungus exercises a remarkable power of discriminating between different food materials. The fungi which it evidently prefers as food, since it is stimulated by them to greater activity of movement, are *Agaricus campestris*, *Boletus flavus* and *Stereum hirsutum*, whilst *Hypholoma fasciculare* was either refused altogether, being left undissolved, or, as in one case, in which the digestion of it seemed to be attempted, the *Badhamia* almost died of indigestion. Starch also, if swollen by moderate heat, was absorbed, and by its stimulant action on the movement of the fungus evidently acted as nourishment. No light, however, was thrown by the experiments on the cause of the rhythmic movements of the plasmodium. The power which the fungus has of apparently communicating information as to the presence of food in contact with a distant part of its network, and of causing a concentration of the plasmodium around and on such food is extremely remarkable. Light appears to have no influence on the movements of the plasmodium, but lack of moisture causes the plant to assume the condition of sclerotium.

New British Moss.

Mr. J. Reynolds Vaizey describes under the name of *Catharinea anomala*, Bryhn., a moss apparently new to Britain. Its specific rank rests however on the fact that capsules are produced laterally as well as terminally. Since he admits that there is no perceptible histological difference between the leaves of his new species and those of *Catharinea undulata*, and has frankly stated that the inflorescence in different individuals may be autoicous, synoicous, or dioicous, the reasons for giving the moss a specific rank seem insufficient. Such a development as he describes is somewhat analogous to that of internodes and leaf-like bracts between the flowers of a normally umbellate or whorled inflorescence, such as *Primula japonica*, the archegonia and paraphyses of a moss generally forming a crowded or whorled series among the terminal leaves, even when only one sporangium is developed. Mr. Vaizey however justly remarks that the occurrence of the sporangium laterally on the same plant that bears a terminal one indicates that the method of classification of mosses into pleurocarpous, cladocarpous and acrocarpous is a highly artificial and unnatural one.

Sexual Organs in Æcidium.

Mr. G. Massee has made a very important addition to our knowledge of an interesting group of fungi, in the discovery of sexual organs in the Æcidium found on *Ranunculus Ficaria*. This resulted from the observation of the fact that the *Uromyces Poœ*, Rab., which is considered by Winter as a stage of the *Æcidium*, was not found at Kew in a season when the latter was abundant. Mr. Massee has traced the formation of the æcidium from the oogonium, which he finds is developed on threads distinct from those bearing the antheridium. The oogonium is at first clavate, becoming after fertilization broadly obovate, the antheridium being cylindrical. The oogonium is surrounded by a number of lateral branches arising from the hypha supporting it, and after a time it becomes nodulose, the basal row of the nodules forming the peridium and the others being produced into basidia, from which the spores are cut off in succession by transverse septa (*Ann. Bot.*, July, p. 47).

MAIZE OIL (OIL OF CORN).*

BY J. U. LLOYD.

It is well known that Indian corn contains considerable quantities of fixed oil, and some years ago endeavours were made to separate this oil from the ground corn before it was mashed in the making of whisky. The writer remembers that the late John Crawford, well known as a Cincinnati pharmacist, embarked in a venture with this object in view and some twelve years ago established a factory in Kentucky opposite the city of Cincinnati for the purpose of making bisulphide of carbon, which was used as solvent to remove the oil. The meal was percolated with this bisulphide of carbon, whereby the fixed oil was removed, and the bisulphide of carbon was afterward recovered by distillation.

It was thought by Mr. Crawford that the cornmeal so treated yielded a larger amount of whisky and of finer quality than when the crude meal was worked. However, after devoting some years to this industry and establishing the carbon process in several sections of the country in connection with distilleries, it was found, I think, that objections rendered it impracticable and that the advantages derived from the process were more than overcome by the disadvantages that followed. In consequence, if I remember correctly, even before Mr. Crawford's death, the schemes were dropped and the industries abandoned.

It has been found in the making of starch and perhaps in other directions as well, that it is desirable to get rid of the germs of the corn, as for reasons that it is unnecessary for me to mention, this germ is objectionable in these manipulations.

In order to accomplish the last result a machine has been devised that degerminizes the corn, throwing the hard starchy part of the corn in one direction and separating the germs in another, and this method can be, and is applied to the making of starch in large quantities, and is found to be of great assistance and advantage.

Naturally, there was an accumulation of these excluded germs, which, as is well known, constitute a considerable proportion of the corn, and they became a by-product. They were found to be valuable as a feed for stock, but really were too "rich" for such purposes, containing as they did a large amount of oil, the oil of the corn being almost altogether found in the germ. In order to render this material more acceptable as a feed for stock, a company was recently established for the purpose of squeezing the fixed oil from the germs, and thus improving the feed meal. A plant was established a few months ago (the only one in existence now, I learn) in the city of Cincinnati for this purpose, and is now in operation. The method is very simple. The germs are conveyed from the factories, wherein they are a by-product (such as starch factories), and are first purified by separating from them a considerable amount of bran or husk of corn that adheres to or is mixed with them. They are then

* Read at a meeting of the Ohio Pharmaceutical Association, Columbus, June, 1888. From the *American Journal of Pharmacy*, July.

steamed under pressure so as to soften them, after which in the usual manner, by means of hydraulic presses, the oil is squeezed from them.

The process is a very simple one, and it yields an oil cake, which when ground into meal is found to be exceedingly valuable as a feed for stock, the manufacturers of this meal claiming that it is superior to corn meal that is made from the whole corn

Thus it is that in addition to the oil cake, which is the prime object of the industry, there is an accumulation of the fixed oil of corn or maize oil, which induces this paper. I accidentally came across this oil, was led to its examination, and, as a result, found that it is in many respects preferable as I believe to cotton seed oil that has recently become officinal in the United States Pharmacopœia as a substitute for olive oil. I have used it in the making of ammonia liniment, to which purpose it is particularly adapted, and in which, to my experience, cotton seed oil is practically a failure.

Oil of corn saponifies immediately, forming with ammonia a smooth creamy emulsion that retains its nature apparently indefinitely, as specimens that I have in my possession, and which I herewith exhibit, are quite old, and are now in their original condition. It does not clot and form masses or curd-like aggregations, as we sometimes find to result with olive oil, in accordance with the manner in which ammonia is added to it, and even if for no other use than the making of ammonia liniment I think it should become officinal for that purpose instead of cotton seed oil. However, I doubt if there is any preparation in the Pharmacopœia that demands olive or cotton seed oil in which it cannot be used, and probably it will be found superior in all other directions. Inasmuch as the industry that yields this oil in course of time promises to increase, and the oil to be obtained in unlimited amounts—indeed it can now be obtained in any quality, car load lots or otherwise—it is not probable that the output will ever be less than the demand. It is peculiarly of necessity an American production, and will always probably be at our command.

The price is reasonable enough, in car loads being 40 cents per gallon; of course in smaller quantities, as it will be obtained by the retail druggists, there will be an increase probably reaching 60 cents, but even if the price should be equal to that of cotton seed oil or a little above it, so far as I am concerned, I say that it has proved in my hands enough superior to cotton seed oil for the making of volatile liniment (wherein I suggest its employment) to merit a better price.

Properties.—Maize oil has been analyzed by an English chemist, and the well-known authority, Prof. Chas. O. Curtman, M.D., of St. Louis, has determined its character as follows:—

"Oil from embryo of Indian corn, in unrefined state, has a specific gravity of 0·916 at 15°C., which is nearly that of pure olive oil (0·915 to 0·918). The elaidin test shows the presence of a large quantity of olein, intermediate in quantity between olive and cotton seed oils. Its colour is a pale yellow brown; its odour and taste that of freshly ground corn meal. It belongs to the non-drying group of the vegetable oils, experiments showing that a very thin layer on paper does not in three weeks' time form a pellicle on the surface exposed to air. In this respect it closely resembles the oils of olive, almond, colza, rape-seed, etc. It does not very rapidly become rancid by exposure to air, and in this regard compares favourably with the best oils. Its use produces no specific purgative effect any more than olive oil. With ammonia or solutions of caustic alkalies it rapidly saponifies, forming a white soap."

Analysis by F. Williams.

Fatty acids (free)	0·88
Total fatty acids	96·70
Unsaponifiable, mucilaginous and albuminous bodies	1·34

The sample is a non-drying oil, and very easy of saponification. Being in a crude state, direct from the mill, I have subjected a portion of the oil to a process of purification or refining, finding the loss sustained to be a little over four per cent.

THE NORWEGIAN COD-LIVER OIL INDUSTRY.*

From a lengthy report of U. S. Consul-General R. B. Anderson, of Copenhagen, published in the 'Reports from the Consuls of the U. S.,' we take the following:—

1. *Preparing the Fish.*

On the way home from the fishing grounds each night, when the sails can be used and the men are free, the day's catch is immediately prepared. The head is removed and saved. Then an incision is made near the tail of the fish in order to let the blood out. The liver and spawn are saved in holders brought especially for the purpose, and the entrails are cast into the sea. The fish designed for drying without salt are now tied together by the tails, two by two, without washing, and hung over racks on shore, where they remain drying in the sun until June 12, it being forbidden by law to take them down sooner, as many men live at great distances from the drying grounds, and in the absence of the law mentioned the temptation to appropriate other men's property was found to be too strong for the first comers to resist. The fish to be salted are usually sold to small smacks, which are sent by the merchants of the cities lying further south to cruise and buy them up. In these vessels the cod are salted in layers in the hold. After being opened to the backbone along the whole length of belly, the bone is removed to the third joint, opposite the navel. The fish receives no washing under this process, even though it is a well-known fact that a little care in this direction would give the finished cod a much better appearance. After completing a load the smacks depart for the small islands lying outside the cities of Throndhjem, Aalesbund, Christiansund and Molde, where the fish are alternately piled in stacks to press the moisture out of them, and then spread on cobblestone pavements on the natural rocks to dry in the sun until ready for export.

2. *Fish Oil.*

Oil occupies by no means an insignificant position among the products of Lofoden, though in amount it varies through the several years far more than the other cod products. From 1876 to 1880 the production averages 45,000 hectolitres per year, while in 1883 not more than 8000 hectolitres were secured, and in 1886 35,000. The value of the product also varies, according to quality and the amount produced, from 25 kroner to 350 kroner per barrel. The preparation of this oil is carried on partly at factories and partly as a sort of domestic industry. The liver saved, as before stated, is sometimes sold to the local factories and sometimes collected in barrels which, at the end of the season, the fisherman takes to his home in order to prepare their contents. In this way the livers often stand many weeks, and upon their arrival a certain quantity of their oil has already been freed by the rotting of some of the liver cells. This is poured off, and then, by repeated boilings over open fires, the rest of the oil is boiled out. In this way four sorts of oil are obtained—raw medicinal, clear (yellow), partly clear (light brown), and refuse or train (brown).

The livers sold to the factories are treated in other ways, and from them is obtained the well-known product which is sold as steam refined cod-liver oil. As much of this is exported to America, where it is admitted to be superior to the Newfoundland oil, I

* From the *American Druggist*, April.

took pains to ascertain the process by which it is prepared, and for this purpose I visited the celebrated factory at Stamsund, established by the late Peter Möller. Here I was well received by the prescnt owner, the son of Peter Möller, who gave me every facility for seeing his works, and assisted me in getting a clear description of his method of preparation, laying special stress upon the fact that there was no secret connected with the process. His own success, he claimed, was due chiefly to a careful selection of the livers and a scrupulous cleanliness at every stage and point of treatment. The very first requirement for the production of a good article of oil is that thc liver should be of the best sort and perfectly fresh. The fish from which it is taken should have been caught the same day as the boiling is done.

When care is observed, and if the thermometer be under the freezing point, the liver may also be used the day following the catch.

After being most carefully sorted, the sick livers being known by their greenish tinge, and lean, scanty ones by a red, or often really black colour (both of these to be unhesitatingly thrown out), the livers, with the gall-bladders removed, are well washed and tried out by one of three processes. The first of these is used in many of the refineries, as the capital required for a plant is not great and the oil obtained may be excellent, if sufficient care be observed in its preparation. In this process the principle is simply even heating of the raw material in water-baths.

The second method, used in the factory I visited, and which I myself witnessed, consists in gradually heating the livers in iron kettles, about and under which steam is circulated freely, the temperature being automatically regulated by ventilators.

The third method is the most rapid, simple and cheap of all, and is mostly used on board vessels which are sent to Lofoden for the sole purpose of trying out oil. It consists of passing steam under some pressure directly into the mass of livers, which heated, rapidly give up their oil. After being obtained by any of these processes and poured off, the oil is cooled more or less, and during a longer or shorter time, during which treatment the stearin separates itself in a ratio proportionate to the degree of cold and the time cooled.

The better sort are kept for a long time at a temperature not above zero C., and are then pressed in cold rooms, filtered and bottled. If all the oils prepared by either of the first two of these methods are not equally good and clear, the reason lies in the fact that the process has not been conscientiously followed, and not in any secret of preparation. The fault generally lies in the choice of the livers. Strong competition often makes it unprofitable to discard large masses of raw material, simply because it is somewhat old or taintcd, especially when it is known that the resulting oil cannot be recognized until after the lapse of some time.

By the third process of trying out the oil—that is, by rapid and high heating of the livers through direct contact with the superheated steam—more oil is obtained, but of a far inferior quality, as it quickly acquires a disagreeable taste, and can be detected by its appearance a short time after preparation. Long experience and extensive experiments at the better factories have demonstrated that the oil should never be heated above 75° C. Oil which has been subjected to a higher tcmperature oxidizes on contact with the air the more rapidly the higher the temperature it has reached. How far the separation of the stearin is of any gain or loss from a therapeutic standpoint is still an open question, but the demand of the public that the oil shall remain clear, even in cold weather, makes the present process necessary. In respect to the amount of stcarin contained, there is a great difference between the Lofoden and Newfoundland oils. While the former yields from 10 to 15 per cent. of its bulk in stearin at a temperature zero C., the latter, under the same conditions, never gives more than 5 or 6 per cent.

The last filtering of the oil cannot be done too carcfully, as there are always minute particles of liver cells held so finely in suspension that only the most painstaking filtering can remove them. At first they arc invisible, but they collect, and later show themselvcs as a sediment at the bottom of the bottle or vesscl in which the oil is preserved.

As to the difference in quality between thc Amcrican and Norwegian cod-liver oil, I think I am safe in saying, as may in fact be seen from the statements already made, that it arises chiefly from the differcnt circumstances under which the fishing is carried on.

At Lofoden the boats used are small and open, and the circumstances require that they shall be ashore every night, and thus the factories can obtain the livers of each day's catch when not more than a fcw hours old. On the other hand, the fishing on the American coast is carried on in decked vessels, fitted for long cruises, touching shore only at long intervals, so that by the time the livers can get to the factories they are old or partly putrefied. To remedy this, and thus bring the large American trade in cod-liver oil mainly or wholly into American hands, I would suggest that our oil refiners send out clean, nicely-fitted steam refining vessels, which should cruise the fishing grounds, buy the livers fresh from the fishing smacks, and try out the oil on the spot and in the manner above described. This plan is thought perfectly practicable by several persons largely interested in the Lofoden industry with whom I have talked. I consulted Dr. F. P. Möller, whose father, Peter Möller, was the first to produce steam-refined cod-liver oil about thirty years ago, about this proposition, and he admitted that if adopted it would be of no small advantage to our American fishermen.

To Dr. F. P. Möller I am largely indebted for the detailed description of the methods and processes of producing medicinal cod-liver oil. As thc American coasts produce such an abundance of cod, it would seem to me that by the plan suggested we might ourselves produce all the cod-liver oil for our own consumption, and even compete in the European and other foreign markets.

FOOD OF LARVAL BEES.*

BY A. V. PLANTA.

The substance investigated was the juice or pap, the whitish sticky substance which the working bees store in the cells of the larvæ of the queens, drones, and workers. Leuckart (*Deutsche Bienenzeitung*, 1854, 1855) regarded it as the product of the true stomach of the working bees, which they vomit into the cells, in the same way that honey is vomited from the honey-stomach. Fischer and others regarded it as the product of the salivary glands of the bees. Schönfeld, in numerous papers, references to which are given, has more recently shown that Leuckart's original view is the correct one. He showcd that the saliva can be easily obtained from the salivary glands of the head and thorax, and that it is very different from the food-juice deposited in the cells by the bees; and that, moreover, the juice is similar, both chemically and microscopically, to the contents of the bee's true stomach; he showed also from the consideration of certain anatomical and physiological peculiarities of the bee, such as the position of the mouth, the inability of the bee to spit, etc., that the view of this substance being saliva is quite untenable. Certain observers have to this replied that a bee cannot vomit the contents of

*From *Zeit. physiol. Chem.*, xii., 327-354. Reprinted from the *Journal of the Chemical Society*, July.

its true stomach, because of a valve which intervenes between it and the honey-stomach ; but Schönfeld has shown that the structure, mistaken by these observers for a valve, does not function as one, but is in reality an internal mouth, over which the animal has voluntary control, and by means of which it is able to eat and drink the contents of the honey-stomach when necessity or inclination arises. By light pressure on the stomach, and stretching out the animal's neck, the contents of the stomach can be easily pressed out.

The present investigations entirely confirm Schönfeld's view that this substance comes from the bee's stomach. The subject was investigated from the point of view of its chemical composition, and also care was taken to investigate, individually, the juice as occurring in the cells of the three varieties of bees, queens, drones, and workers.

Some preliminary microscopical examinations of this substance yielded the following results, which are quite in accord with the subsequent chemical analyses :—

1. The food of the queen-bee larvæ is the same during the whole of the larval period ; it is free from pollen grains, which have been reduced to a thickish but homogeneous juice by the digestive action of the bee's stomach.

2. The food of the larval drones is also, during the first four days of the larval period, free from pollen, and appears to have been completely digested previously. After four days their food is rich in pollen grains, which have, however, undergone a certain amount of digestion. The food stuff of the larvæ is probably formed from bee-bread.

The following table gives the average percentages obtained from several analyses in most cases :—

	Food stuff of		
	Queen-bees.	Drones.	Working-bees.
Water	69·38	72·75	71·63
Total solids . . .	30·62	27·25	28·37
In the solids—			
Nitrogenous material	45·14	43·79	51·21
Fat	13·55	8·32	6·84
Glucose.	20·39	24·03	27·65
Ash	4·06	2·02	—

All kinds are thus rich in nitrogen ; all were of a greyish-white colour ; that of the queen-bee was the stickiest, that of the workers the most fluid. Peptone appeared to be absent ; the greater part of the nitrogenous material present was proteïd. The ethereal extract was in all cases acid, but formic acid was absent.

The sugar present was, in all cases, invert-sugar, whereas the sugar in pollen grains is invariably cane-sugar.

The table shows certain differences in the composition of the different kinds of larval food, more especially in the composition of the solids present. Its composition is, moreover, quite different from that of the bee's saliva, which, for instance, contains no sugar. The difference between the proportional amount of the different solids present in the different forms of larval food is a constant one, and no doubt this variation has in view the particular requirements of the larvæ in question. Certain small but constant differences were also observed in the chemical composition of the food of the larval drones during the first four days and at subsequent periods.

Not only is there a difference in the quality, but there is also one in the quantity of the food supplied. The juice from 100 queen-bee cells yielded 3·6028 grams of dry substance, that from 100 drones' cells 0·2612 gram, that from 100 workers' cells 0·0474 gram.

SELECTIONS FROM THE NATIONAL FORMULARY

Issued under the auspices of the American Pharmaceutical Association.

Elixir Adjuvans.

Adjuvant Elixir.

Sweet Orange Peel, recently dried	2 troy ounces.
Wild Cherry.	4 „ „
Glycyrrhiza, Russian, peeled .	8 „ „
Coriander	1 troy ounce.
Caraway	1 „ „
Alcohol,	
Water	each, a sufficient quantity.
Syrup . . .	enough to make 1 gallon.

Grind the Wild Cherry to a moderately coarse (No. 40) powder, moisten it with *four* (4) *fluid ounces* of Water and set it aside for twelve hours. Reduce the other solids also to a moderately coarse (No. 40) powder, mix this intimately with the Wild Cherry, and having mixed *one* (1) *volume* of Alcohol with *two* (2) *volumes* of Water, moisten the powder with *four* (4) *fluid ounces* of the mixture, and pack tightly in a percolator. Then gradually pour menstruum on top until *ninety-six* (96) *fluid ounces* of percolate are obtained. Mix this with *thirty-two* (32) *fluid ounces* of Syrup, and filter.

Note.—This preparation is chiefly intended as a vehicle, particularly for acrid or saline remedies.

Elixir Apii Graveolentis Compositum.

Compound Elixir of Celery.

Fluid Extract of Celery Root .	1 fluid ounce.
Fluid Extract of Erythroxylon	1 „
Fluid Extract of Kola . . .	1 „
Fluid Extract of Vibernum Prunifolium	1 „
Alcohol.	2 fluid ounces.
Aromatic Elixir enough to make	16 „

Mix the Alcohol with *four* (4) *fluid ounces* of Aromatic Elixir. To this add the Fluid Extract of Celery Root in several portions, shaking after each addition, and afterwards the other fluid Extracts. Finally add enough Aromatic Elixir to make *sixteen* (16) *fluid ounces* ; allow the mixture to stand twenty-four hours, and filter.

Note.—If this preparation is prescribed or quoted under its Latin title, it is recommended that the full title be given, so that the word "Apii" may not be mistaken for "Opii."

Elixir Aromaticum.

Aromatic Elixir.

Aromatic Spirit	16 fluid ounces
Syrup	24 „
Water	24 „
Purified Talcum.	1 „

Mix the Aromatic Spirit with *twelve* (12) *fluid ounces* of Syrup, and add the Water. Incorporate the Purified Talcum thoroughly with the mixture, set the latter aside during a few days, if possible, occasionally agitating, then stir it well, and filter it through a wetted filter, returning the first portions of the filtrate until it runs through clear. Finally mix the filtrate with the remainder of the syrup.

Note.—When this Elixir is to be used in preparations containing *iron*, the Aromatic Spirit to be used in its preparation should be that made from the essential oils.

If it is desired to colour this Elixir, this may be effected by the addition of *two* (2) *fluid drachms* of Compound Tincture of Cudbear to each pint.

Elixir Caffeinæ.

Elixir of Caffeine.

Caffeine	128 grains.
Dilut. Hydrobromic Acid, U.S.P.	32 „
Syrup of Coffee	4 fluid ounces
Aromatic Elixir enough to make	16 „

Rub the Caffeine, in a mortar, with the Diluted Hydrobromic Acid and about *two* (2) *fluid ounces* of Aromatic Elixir, until solution is effected. Then add the Syrup of Coffee, and lastly, enough Aromatic Elixir to make *sixteen* (16) *fluid ounces*. Filter, if necessary.

Each fluid drachm contains 1 *grain of Caffeine.*

Elixir Calcii Hypophosphitis.

Elixir of Hypophosphite of Calcium.

Hypophosphite of Calcium	256 grains.
Citric Acid	30 ,,
Aromatic Elixir	enough to make 16 fluid ounces.

Dissolve the Hypophosphite of Calcium in *fourteen* (14) *fluid ounces* of Aromatic Elixir, and filter. Dissolve the Citric Acid in the filtrate and pass enough Aromatic Elixir through the filter to make *sixten* (16) *fluid ounces.*

Each fluid drachm contains 2 *grains of Hypophosphite of Calcium.*

Elixir Catharticum Compositum.

Compound Cathartic Elixir.

Fluid Extract of Senna	2 fluid ounces.
Fluid Ext. of Podophyllum	1 fluid ounce.
Fluid Extract of Leptandra	360 minims.
Fluid Extract of Jalap	360 ,,
Tartrate of Potassium and Sodium	2 troy ounces.
Bicarbonate of Sodium	120 grains.
Comp. Elixir of Taraxacum	4 fluid ounces.
Elixir of Glycyrrhiza	enough to make 16 ,,

Mix the liquids, add the salts, and dissolve them by agitation. The products should not be filtered, and should be shaken up whenever any of it is dispensed.

The average dose for an adult is 2 *fluid drachms.*

Elixir Chloroformi Compositum.

Compound Elixir of Chloroform.

Chloroform	3 fluid ounces.
Tincture of Opium	3 ,,
Spirit of Camphor	3 ,,
Aromatic Spirit of Ammonia	3 ,,
Alcohol	3 ,,
Oil of Cinnamon (Cassia)	40 minims.
Water	enough to make 16 fluid ounces.

Mix the Chloroform with the Alcohol, then add the Oil of Cinnamon, Aromatic Spirit of Ammonia, Spirit of Camphor, Tincture of Opium, and lastly, enough Water to make *sixteen* (16) *fluid ounces.* Allow the mixture to stand a few hours, and filter in a well-covered funnel.

Each fluid drachm represents about 1 *grain of Opium and* 11 *minims of Chloroform.*

Note.—This preparation is called Chloroform Paregoric in some sections of the country. It is recommended that this title be abandoned, to prevent confusion with the officinal Paregoric or *Tinctura Opii Camphorata.*

Elixir Cinchonæ, Ferri, et Calcii Lactophosphatis.

Elixir of Cinchona, Iron and Lactophosphate of Calcium. Elixir of Calisaya, Iron and Lactophosphate of Lime.

Lactate of Calcium	64 grains.
Phosphoric Acid (50 p. c.)	64 minims.
Water of Ammonia	½ fluid ounce.
Citric Acid	120 grains.
Elixir of Cinchona and Iron [*Detannated*]	enough to make 16 fluid ounces.

Dissolve the Lactate of Calcium in *seven* (7) *fluid ounces* of Elixir of Cinchona and Iron, with the aid of the Phosphoric Acid. Then add the Citric Acid, and when this is dissolved, the Water of Ammonia. Finally add enough Elixir of Cinchona and Iron to make *sixteen* (16) *fluid ounces*, and filter.

Each fluid drachm contains ½ *grain of Lactate of Calcium* (*or about* ¾ *grain of so called Lactophosphate of Calcium*), *and nearly* 2 *grains of Phosphate of Iron.*

Elixir Curassao.

Elixir of Curaçao. Curaçao Cordial.

Spirit of Curaçao	120 minims.
Orris Root, in fine powder	30 grains.
Deodorized Alcohol	4 fluid ounces.
Citric Acid	50 grains.
Syrup	8 fluid ounces.
Purified Talcum	120 grains.
Water	enough to make 16 fluid ounces.

Mix the spirit of Curaçao with the Alcohol, add the Orris Root, the Purified Talcum, and *three* (3) *fluid ounces* of Water. Allow the mixture to stand twelve hours, occasionally agitating; then pour it on a wetted filter, returning the first portions of the filtrate until it runs through clear, and pass enough Water through the filter to make the filtrate measure *eight* (8) *fluid ounces.* In this dissolve the Citric Acid, and finally add the Syrup.

Elixir Eriodictyi Aromaticum.

Aromatic Elixir of Eriodictyon. Aromatic Elixir of Yerba Santa; Elixir Corrigens.

Fluid Extract of Eriodictyon	1 fluid ounce.
Syrup	8 fluid ounces.
Pumice, in fine powder	½ troy ounce.
Carbonate of Magnesium	80 grains.
Compound Elixir of Taraxacum	enough to make 16 fluid ounces.

Mix *seven* (7) *fluid ounces* of Compound Elixir of Taraxacum with the Syrup and Pumice, then add the Fluid Extract, and mix the whole thoroughly by agitation. Shake the mixture occasionally during two hours, then allow it to settle, and carefully decant the liquid into a funnel, the neck of which contains a small pellet of absorbent cotton. Afterwards add the dregs, and allow them to drain. To the filtrate add the Carbonate of Magnesium and shake occasionally during several hours. Let the mixture stand at rest during twelve hours, if convenient, then decant the liquid, and filter it through paper. To the filtrate add enough Compound Elixir of Taraxacum, if necessary, to make *sixteen* (16) *fluid ounces.*

Note.—This preparation is chiefly intended as a vehicle for Quinine and other bitter remedies.

Elixir Erythroxyli et Guaranæ.

Elixir of Erythroxylon and Guarana. Elixir of Coca and Guarana.

Fluid Extract of Erythroxylon	2 fluid ounces.
Fluid Extract of Guarana	2 fluid ounces.
Purified Talcum	120 grains.
Compound Elixir of Taraxacum	12 fluid ounces.

Mix the liquids, and thoroughly incorporate the Purified Talcum with the mixture. Let it stand during forty-eight hours, if convenient, occasionally agitating, then filter.

Each fluid drachm represents 7½ *grains each of Erythroxylon* (*Coca*) *and Guarana.*

Elixir Glycyrrhizæ.

Elixir of Glycyrrhiza. Elixir of Liquoriee.

Purified Extract of Liquorice	1 troy ounce.
Water of Ammonia	a sufficient quantity.
Aromatic Elixir	enough to make 16 fluid ounces.

Triturate the Purified Extract of Liquorice with *twelve* (12) *fluid ounces* of Aromatic Elixir gradually added. To *ten* (10) *fluid ounces* of this mixture add Water of Ammonia in drops, until it is in slight excess. Mix this with the reserved portion, and finally add enough Aromatic Elixir to make *sixteen* (16) *fluid ounces.* Filter, if necessary.

The Pharmaceutical Journal.

SATURDAY, JULY 28, 1888.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

"LEAVING CERTIFICATES" AND THE PRELIMINARY EXAMINATION.

IN the absence of any specific enactment by which the passing of a suitable examination would be made an indispensable preliminary to pharmaceutical apprenticeship, it is satisfactory to find that provision of a different nature is being made which will tend towards the realization of that very desirable requirement. For some time past the Scotch Education Department has been engaged in organizing a scheme of examinations to be held in connection with secondary schools for the purpose of granting what are termed "leaving certificates." The object of that scheme is to substitute in place of the old-fashioned and often valueless displays that took place at the winding up of the school term, a more useful method of testing the solid attainments of the scholars and of obtaining a guarantee of careful tuition. It was sought in this way to give definite aim to the ordinary school work, to mark in a precise manner the completion of the school course, and lastly to furnish scholars leaving school with a certificate that could be accepted as proof of their having successfully passed through a course of training in certain specified subjects. On these lines an inspection of schools has for the past year or two been carried out by officers appointed by the Department, but very little has hitherto been heard as to the results arrived at by this inspection or its effects on school management and school work. Information of that nature has now been furnished by the announcements made in connection with the examinations held from the 18th to the 26th of June last, and there seems reason for anticipating that the new system will be productive of much benefit. The number of schools represented at these examinations was 29, and the number of candidates presenting themselves was 972. Immediately after the publication of the official returns the results affecting the scholars of each school were intimated to its authorities, and official certificates duly signed were distributed among the scholars. The intention of these certificates was to obviate the necessity for a number of corporate bodies undertaking separate preliminary examinations, adapted to suit the requirements of different professions and callings, but in common partaking of the character of school examinations. It was expected that these "leaving certificates," having the official stamp of the Government, would be readily accepted by different examining boards connected with corporations, and that such bodies would generally be glad to be relieved from the duty of conducting these examinations. It appears that this expectation has been to some extent realized, and there is reason to believe that it will be still more fully justified when the nature of the examination becomes better known.

The question as to the character of these examinations is, of course, one that will require to be carefully considered in regard to the value to be assigned to the certificates by which the ordinary preliminary examinations are to be superseded. Examining bodies cannot be expected to accept certificates obtained by means of an examination implying lower attainments than those which it is considered necessary to demand. But in that respect there seems to be every reason to believe that the examinations for "leaving certificates" will be found quite satisfactory and such as to offer an advantageous substitute for the ordinary preliminary examinations of corporate bodies. It is indeed stated that if the examiners have erred at all they have done so on the side of aiming too high rather than too low. There was indeed some fear before the results of the late examinations were announced that the test in certain subjects would prove too severe when applied to school boys. It appears, however, from the results of the examination these fears were to a great extent unfounded, for out of 2925 certificates applied for by the 972 candidates they succeeded in obtaining 2332. This small proportion of failures may have been due partly to the exercise of a wise discretion on the part of the examiners when putting the system in force for the first time, but in any case that system appears to offer a means of satisfying the much-felt want of applying the preliminary examinations requisite for technical purposes at the proper time and leaving no excuse for their being deferred to a period of life when it seems almost absurd to have to pass through such an ordeal. One great value of this system of examinations will lie in the stimulus which they are intended to give to the ordinary work of schools from day to day throughout the year. They are with that object so devised that they cannot be met by cramming, but only by careful and systematic training of the mental powers, and hence they will tend to spread the work of preparation over a prolonged period and to defeat the hopes of those who rely on the forcing work of a few days before the examination. By thus making the test in the strictest sense an educational one, the great objection to competitive examinations will be avoided.

Certain corporations, and among others we be-

lieve the Medical Council, have already expressed their willingness to accept these certificates in lieu of their own special preliminary examination, and it is probable that the same course will be adopted in regard to the Preliminary examination of the Phamaceutical Society. The question has been for some time under consideration by the Council in consequence of a communication from the Scotch Education Department asking whether the Society would be prepared to accept in lieu of the preliminary examination the certificates of bodies it was proposed to establish for that purpose. At the Council meeting in February last the communication was remitted to a committee for consideration, and in the report of that committee presented at the Council meeting in March, it was recommended that such of the certificates referred to as are accepted by the Medical Council should be accepted by the Board of Examiners in lieu of the Preliminary examination, provided the examinations comprised Latin, English and arithmetic. At a meeting of the Executive of the North British Branch of the Society last month the same subject was referred to by Mr. KERMATH, of St. Andrews, who drew attention to the local examinations being conducted in connection with the University of St. Andrews at a large number of centres throughout Scotland, and pointed out that it would be much more convenient for youths entering the trade to pass their preliminary examinations locally than to come up to more distant centres for the Society's examination. On the same occasion Mr. PATERSON, of Aberdeen, in expressing concurrence with that view, mentioned the scheme which had been provisionally carried out at Gordon's College of giving certificates that could be accepted by the Society in lieu of the Preliminary examination. He then stated that there was every chance that the plan would succeed, and suggested that it might perhaps eventually be extended to some of the subjects at present included in the Minor examination. So far as the Preliminary examination is concerned it does not, however, seem to have been noticed that the recommendation to accept the certificates referred to had been adopted by the Council more than three months previously, as reported in this Journal.

Pharmaceutical students in Leicester and the immediate neighbourhood may be congratulated upon the fact that, by the establishment of a local botanical garden, special provision has now been made for facilitating their study of botany. This undertaking was initiated by Mr. J. G. F. Richardson, who, as a member of the town council of Leicester, pointed out the want of a suitable botanical garden and the fitness of the Abbey Park for that purpose. With the assistance of Professor Hillhouse, of Mason's College, Birmingham, who gave his advice as to the execution of the project, a number of beds have been laid out in the park with specimens of plants most useful to pharmaceutical and other students. On Thursday last, the members of the local association paid a visit to the garden, and after inspecting the arrangements that were being made, passed a hearty vote of thanks to Mr. Mott and Mr. Burn, who had rendered assistance in this useful work.

* * *

According to a notice that appears in the last number of the official journal of the German Apotheker-Verein the annual meeting of that body will take place in Berlin, commencing on the 10th and extending over the 11th and 12th of September, under the presidency of Dr. Brunnengräber, who will be well remembered as having taken a prominent part in the International Congress held in London in 1881. On various occasions British pharmacists who have taken advantage of the friendly reception accorded to them at these annual meetings have thus been enabled to make the personal acquaintance of their German brethren, and to establish friendly relations between the representative bodies of the two countries. It frequently happens that the annual meeting of the Apotheker-Verein is held at the same time as the British Pharmaceutical Conference, but this year the meeting takes place at a time sufficiently removed from that of the Conference meeting at Bath to admit of a subsequent visit to Berlin. As there seems now to be no possibility of carrying out this year the project of an International Congress at Milan, the opportunity afforded by the Berlin meeting may induce some wandering pharmacists to direct their steps northwards.

* * *

At an inquest held last Thursday on the body of a child poisoned by carbolic acid, Dr. Farden stated that this was the fifth fatal case of poisoning through drinking the contents of unlabelled bottles that had been admitted to the Middlesex Hospital. In this particular instance the main feature is the carelessness displayed in leaving so dangerous an article as carbolic acid within reach of a mere infant; but as is usual in such cases one of the daily papers in commenting upon the case assumes that the poison was sold by a chemist, and expresses the opinion that there was criminal carelessness on his part in supplying the poison without a proper label. Dr. Danford Thomas, the coroner, also strongly condemned this omission and the jury was of opinion that the attention of the Home Secretary should be called to the frequency of such incidents. It did not, however, appear that the carbolic acid had been obtained from a chemist, and the fact was entirely overlooked that carbolic acid and several other poisonous substances in common use can be obtained from oil shops, and that under existing conditions there is no obligation on the vendors to label such articles with the poison label which it is customary to use when they are sold by chemists and which is, in fact, always used when they are obtained from chemists. In a letter that appeared from a medical man in reference to this case the injustice of attributing blame to a chemist was very properly pointed out, and the danger attending the sale of carbolic acid and other poisonous substances by oilmen was spoken of as having frequently come under his notice.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

July, 1888.

18*th*.—Certificates of approved examining bodies were received by the Board of Examiners for England and Wales from the undermentioned in lieu of the Society's examination:—

Bowen, John.....Machynlleth.
Dale, John Arthur .....Nantwich.
Hebbeler, Karl.....London.
Mallinson, Frederick William Spalding.
Simpson, Robert .....Sunderland.
Wain, Clement John .....Hanley.

19*th*.—The Report of the College of Preceptors on the examination held on July 10 was received.

Three hundred and ninety-one candidates had presented themselves for examination, of whom *one hundred and eighty* had failed. The following *two hundred and eleven* passed, and the Registrar was authorized to place their names on the Register of Apprentices or Students:—

Alcock, William .....Sheffield.
Anderson, Alfred Laker.....London.
Anderson, David.....Perth.
Angel, Lorenzo Valencia .....Birmingham.
Ashton, Henry Maitland .....London.
Auld, William .....Liverpool.
Baker, Henry Charles.....Bath.
Bate, Walter Humphries .....London.
Baty, William John .....Newcastle-on-Tyne.
Baylass, Walter .....South Shields.
Belcher, George Clement .....West Bromwich.
Bellamy, Winter George.....Gorleston.
Black, James .....Dumfries.
Blankley, Frank Ferniough ...Arnold.
Boardman, Frederick James...Hindley Green.
Booth, James Valentine.....Torry.
Booty, Clifford William.....London.
Bower, William Harold B.....Oxford.
Bowker, John Taylor .....Farnworth.
Boyd, William George .....Dysart.
Brice, Frederic Grattan .....Leicester.
Bristow, Ralph Pratt .....High Wycombe.
Brown, John.....Edinburgh.
Burns, John Mackie .....Edinburgh.
Bush, James Edward.....Dunmow.
Caldwell, John.....Kirkintilloch.
Christie, George .....Dunfermline.
Cocker, Lewis Alexander .....Ripponden.
Cowie, William B. ....Mains of Newrain.
Crofts, John Lawrence .....Walsall.
Cumber, William Gallienne ...Guernsey.
Cumming, William.....Edinburgh.
Cunningham, John.....Ayr.
Dalrymple, Thomas.....Whitehaven.
Darch, Ernest .....London.
Davidson, Albert Edward .....Seaham Harbour.
Davies, Daniel..... .....Talley.
Davies, David .....Llansawel.
Davies, Ellis J... .....March.
Davies, John William.....Llangollen.
Davies, William .....Greenock.
Denton, James.....Hemsworth.
Dewhurst, William.....Blackburn.
Dey, Alexander John .....Edinburgh.
Dinwiddie, Edward John ... ..Dumfries.
Douthwaite, Fred .....Beverley.
Drabble, Fred Pearson .....Rotherham.
Edwards, Wilfrid Bowers.....London.
Elder, David.....Peebles.
Ellwood, Michael John .....Brighton.
Fairhurst, William .. ..Wigan.
Fairweather, James Young ...Forfar.
Fall, George.....Ripon.
Faulkner, William .....Newark.
Faye, Thomas William de .....Jersey.
Ferguson, Howard .....Chesterfield.
Fitt, Fred .....Norwich.
Fletcher, Herbert Parker .....Scunthorpe.
Forbes, John Johnstone.....Buckie.
Forgie, William Burns .....Falkirk.
Gammie, John Lawrence .....Cullen.
Gardiner, John Adams .....Bridgnorth.
George, William Gilbert .....Cardiff.
Girvan, Alexander .....Maybole.
Goring, James Francis .....London.
Gower, Thomas Herbert .....Kidwelly.
Green, Walter Joseph.....Frome.
Greenhalgh, Edmd. Parkinson..Bolton.
Gregory, John James .....Bredbury.
Griffiths, David Thomas .....Neath.
Hall, James Locke .....Kelvedon.
Hammond, William Herbert...West Burton.
Harrison, Fred.....Ramsbottom.
Hawes, John Geo. Hoadley ...Chichester.
Haworth, John Ernest .....Guernsey.
Hearnshaw, Frank Ogden.....Spalding.
Hebden, Harry .....Bradford.
Henderson, Frederick Ernest..Gosforth.
Henderson, Robert .....Carlisle.
Herald, Walter Ogilvie .....Godley.
Herrod, Matthew .....Lincoln.
Hirst, John Henry .....Chesterfield.
Hocking, Arthur Henry .....Liskeard.
Hodge, Ernest .....Devonport.
Holgate, Albert .....Burnley.
Holliday, Solomon .....Maryport.
Hooper, Joseph .....Okehampton.
Hora, Tudor Travers .....London.
Hoskins, Augustus Stevens ...London.
Howell, Gwilym Harris ... .Brecon.
Hudson, Sutherland .....Dumbarton.
Hughes, Thomas John .....Bethesda.
Hughson, Alexander Sinclair...Bath.
Humfrey, William Henry .....Romford.
Isaac, Herbert Kennedy .....Clifton.
Jacoby, James Stuart Russell Barton-on-Humber.
Jarvis, John .....London.
Jarvis, Richard Montague .....Brighton.
Jenkins, Hugh Llewyllyn .....Llanelly.
Jeremiah, Tom Charles .....Newcastle Emlyn.
Jesson, George Pedley .....Leeds.
Johnson, Thomas.....Bilston.
Johnstone, William S. L. .....Coventry.
Jones, Frank Hedley .....Scarborough.
Jones, Thomas.....Rhiwbryfdir.
Keast, William Arthur .....Aberdare.
Kinsman, William Ernest .....Devonport.
Knight, Angus Arthur .....Bradford.
Lambert, William .....Kidderminster.
Le Poidevin, Ernest John .....Jersey.
L'Estrange, Louis John.....Norwich.
Lightfoot, William.....Wigton.
Lovibond, James Joseph .....Plymouth.
McKellar, Henry L. .....Falkirk.
McLennan, Kenneth W.....Lochboisdale.
McOwat, John Hogg .....Glasgow.
Mansell, Thomas Caleb .....London.
Maries, Charles Alexander ...Liverpool.
Marsden, Joseph Yates .....Blackburn.
Marshall, John Thomas.....Derby.
Melville, John .. ..Edinburgh.
Miller, Harry .....Carlisle.
Milne, Alexander Morrison ...Aberdeen.
Moat, Henry.....Newcastle-on-Tyne.
Mundy, Albert Edward .....London.
Murchie, John .....Girvan.
Murnaghan, Arthur Walter ...Southampton.

Neeson, Horaee J. ... .London.
Neil, Henry ....Stirling.
Neilson, Richard.....Glasgow.
Newey, Thomas .....Chesterfield.
Norgate, Charles Edward .....Great Yarmouth.
Owen, William Edward.....London.
Owens, Thomas .....Narberth.
Paternoster, William Chas. T...Cireneester.
Peaeoek, William Edward.....London.
Powell, Daniel Evans.....South Stockton.
Price, Charles Hedley .....Leominster.
Prior, Samuel .....Coekermouth.
Pritehard, Robert John .....Old Swindon.
Pritehard, Thomas .....Clynog Fawr.
Pugh, Edward Lister .....Leeds.
Rees, John .....Pentreehwyth.
Reynolds, John .....Tuxford.
Riehard, Charles.....Hayle.
Riehardson, David Bee .....Edinburgh.
Roberts, Edward.....Bala.
Roberts, Rees R. .....Blaenau Festiniog.
Robinson, William Samuel ...Barrow-in-Furness.
Robson, Joseph Frederiek.....Bishop Auekland.
Robson, Nieholas White .....Allendale.
Robson, William F... .....Ardelaeh.
Roe, Alfred .....Wolverhampton.
Rollin, Arthur Stanley .....Durham.
Rook, Moses.....Maryport.
Roper, Albert Charles .....Norwich.
Rose, James Dudfield, Junr. ...Jarrow-on-Tyne.
Rossiter, Charles Benjamin ...Amlwch.
Rossiter, Samuel.....Paignton.
Royal, Andrew.....Aberdeen.
Sandford, Harry Moile .....Manehester.
Seott, Walter .....Berwiek-on-Tweed.
Shand, James .....Dunfermline.
Shaw, James Edward.....Leeds.
Shepherd, Herbert William ...Bradford.
Shuttleworth, Thomas Repton..London.
Skeates, Frank.....Bath.
Smedley, Thomas .....Hueknall Torkard.
Smedley, Walter Graham .....Northampton.
Smith, John Thomas .....Gateshead.
Smith, Perey Dolph .. ..Brighton.
Sowray, Walter .....York.
Spieer, Maleolm . .....East Molesey.
Springett, Basil Charles Wm...London.
Stanley, John ....Goole.
Stevenson, James Ross .....Montrose.
Sutton, John Edward .....London.
Tatler, Albert Edward .....Hanley.
Taylor, Herbert .....Netherton.
Terry, Edmund Octavius .... London.
Thomas, Charles Herbert .....Shepton Mallet.
Thomas, William John .....Dorrington.
Thomson, Robert..... .....Buekhaven.
Thorne, Alfred John .....Tunbridge Wells.
Thwaites, Alfred.....Ryde.
Tiekle, Thomas .....Exbourne.
Tooke, Harry .....London.
Triek, Walter Henry .....Shebbear.
Turner, Walter Frederiek .....Norwieh.
Ventham, Arthur William.....Portsmouth.
Walker, Albert Storrs.....Kendal.
Walker, George .....Inseh.
Walker, Vernon .....Sheffield.
Wharram, Thomas Barnard ...Naburn.
Whitfield, Albert Hardy ... ..Harrogate.
Wileox, Ernest Lloyd.....Ironbridge.
Wileman, Frederie Walter.....Lineoln.
Wilkinson, James Heyes ... ..Preston.
Williams, Alfred.....Clifton.
Williams, David .....Carmarthen.
Williams, David Isaac .....Llanwrtyd Wells.
Williams, John .....Bagillt.
Williams, Sydney Rhys.....Llanelly.
Wilson, Thomas Comben .....Stowmarket.
Wood, Arthur Henry ....Nottingham.
Wood, Vineent Lowrie .....East Cowes.
Wood, William Henry .....Runeorn.
Wright, Arthur ....Bury St. Edmunds.
Wright, Charles F. .....Liverpool.
Yates, George William .....Stoke-on-Trent.
Yule, Thomas .....Dunfermline.

The questions set at this examination were published in the *Pharmaceutical Journal* for July 14, p. 27.

The following is a list of the eentres at whieh the examination was held, showing the number of eandidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	14	7	7	Jersey	2	2	0
Birmingham	23	7	16	Lancaster	4	2	2
Brighton	6	5	1	Leeds	21	12	9
Bristol	9	7	2	Lineoln	5	2	3
Cambridge	4	2	2	Liverpool	11	6	5
Canterbury	1	0	1	London	48	28	20
Cardiff	5	3	2	Manehester	19	12	7
Carlisle	18	9	9	Neweastle-on-T.	21	9	12
Carmarthen	18	11	7	Northampton	2	1	1
Carnarvon	10	4	6	Norwich	8	7	1
Cheltenham	2	1	1	Nottingham	14	6	8
Darlington	6	3	3	Oxford	4	1	3
Dundee	8	3	5	Peterborough	3	2	1
Edinburgh	28	13	15	Sheffield	14	7	7
Exeter	8	6	2	Shrewsbury	9	6	3
Glasgow	20	12	8	Southampton	5	3	2
Guernsey	2	2	0	Truro	2	2	0
Hull	8	4	4	Woreester	1	1	0
Inverness	2	1	1	York	6	2	4

The following particulars respeeting this examination have been supplied by the College of Preeeptors:—

Preliminary Examination.

July, 1888.

At this examination 391 candidates were examined, and of these 211 passed and 180 failed.

In Latin 273 eandidates were examined in Cæsar and 18 in Virgil.

Of the 180 eandidates who failed,
78 failed in one subjeet only;
68 „ „ two subjeets only;
25 „ „ three subjeets.
9 obtained the required marks in eaeh subjeet, but failed to secure the pass aggregate.

Of those who failed in one subjeet only,
14 failed in Latin;
49 „ „ Arithmetie;
15 „ „ English.

Of those who failed in two subjeets only,
28 failed in Latin and Arithmetic;
14 „ „ Latin and English;
26 „ „ Arithmetie and English.

Of the 180 who failed only 18 sueceeded in obtaining the required pass aggregate.

Of the 80 failures in English 23 are attributed to bad spelling.

EXAMINATIONS IN EDINBURGH.

July 17, 18, 19 *and* 20, 1888.

Present on each day—Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Professor Sir Douglas Maclagan was present on the 19th on behalf of the Privy Council.

MAJOR EXAMINATION.

17*th.*—*Two* candidates were examined. *Both* passed, and were declared qualified to be registered as Pharmaceutical Chemists :—

Melvin, George ....Aberdeen.
Wilson, John .....Aberdeen.

MINOR EXAMINATION.

17*th.*—*Eleven* candidates were examined. *Six* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists :—

Bower, Frederic Riseley.....Macclesfield.
Buchan, David Donaldson.....Stirling.
Burn, David Haitly.....Arbroath.
Colley, Henry .....Hull.
Duncan, James Davidson .....Aberdeen.

18*th.*—*Eleven* candidates were examined. *Four* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists :—

Emerson, John Thomas .....Percy Main.
Gale, William Wheatley .....Newcastle-on-Tyne.
Halley, John Milne.....Pesth.
Horne, Joseph .....Aberdeen.
Hudson, John Beckinton .....Newcastle-on-Tyne.
Hughes, Philip Henry Alban...Liverpool.
Hunter, Robert .....Glasgow.

19*th.*—*Fourteen* candidates were examined. *Three* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists :—

Lockwood, Johnson .....York.
McGeorge, David..... .... Castle Douglas.
Mason, Robert..... .....Paisley.
Merson, George .....Fraserburgh.
Peterkin, Charles John .....Elgin.
Pirie, James .....Keith.
Rae, William Murdoch .....Airdrie.
Reid, David ... .Montrose.
Reid, David Speed Clark .....Glasgow.
Reith, Alexander.....Aberdeen.
Richardson, George Lowas ...Appleby.

20*th.*—*Thirteen* candidates were examined. *Six* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists :—

Forbes, Robert .....Aberdeen.
George, Alexander Cosgrove...Rusholme.
Hunter, John ....Paisley.
Stark, James.....Liverpool.
Thomas, Joseph .....Garstang.
Wilkinson, Thomas..... ..Crook.
Williams, Edwin.....Liverpool.

EXAMINATION PAPERS.

The following are the questions that were set for the competitions for the Council Examination Prizes and the Medals and Certificates in the School of Pharmacy:—

THE COUNCIL EXAMINATION PRIZES.

I. PEREIRA MEDAL (SILVER); and Books of the value of £5 presented by Mr. T. H. Hills.

II. PHARMACEUTICAL SOCIETY'S MEDAL (SILVER); and Books of the value of £3, presented by Mr. T. H. Hills.

III. PHARMACEUTICAL SOCIETY'S MEDAL (BRONZE); and Books of the value of £2, presented by Mr. T. H. Hills.

July 23, 1888.

BOTANY AND MATERIA MEDICA.

Time: 10 *a.m.* to 1 *p.m.*

In framing Answers Candidates should not enlarge upon the Questions, but should confine themselves to giving, as briefly and clearly as they can, the information required.

BOTANY.

1. Explain how absorption and transmission of fluids take place in cellular and vascular plants. Describe intracellular circulation, and state in which plant it is most marked.

2. Why are the different parts of the flower considered homologous with the leaf? What is a Carpophore, and in which natural orders does it usually occur?

3. Explain the formation in plants of alkaloids, gums, oils and resins.

4. Give the distinguishing characters and the official orders of the sub-class Thalamifloræ.

MATERIA MEDICA.

1. Give the botanical source and characters of true Jalap. How may it be distinguished from spurious? What is Jalapin, and how obtained? Does it differ from Resin of Jalap?

2. From what plant is Balsam of Peru derived? State its chemical composition and how it may be distinguished from Gurjun Balsam.

3. Describe the different stages in the Pharmacopœia process for the isolation of Digitalin. What is its constitution? Has it any relation to Digitoxin.

4. What is Hydrastin? Mention the sources from which it may be procured.

CHEMISTRY.

Time: 2 to 5 p.m.

1. Explain the term "dissociation."

2. What is the action of hypophosphoric acid on solutions of the following :—(*a*) Chlorine; (*b*) Argentic nitrate; (*c*) Mercuric chloride? What occurs when the pure acid is strongly ignited?

3. What action takes place when bromide is added to a warm solution of a manganous salt?

4. Mention the chief reactions by which the fatty acids are formed.

5. What is meant by the word "glucoside"; and how may the glucosidal nature of a substance be demonstrated?

6. I have obtained by experiment 25 c. c. of nitric oxide, measured at 17° C., with the barometer at 29 inches. To what weight of amyl nitrite does that amount of nitric oxide correspond?

SCHOOL OF PHARMACY.

CHEMISTRY AND PHYSICS.

SESSIONAL EXAMINATION FOR A SILVER MEDAL AND THREE CERTIFICATES OF HONOUR.

Part I.—Physics.

Time allowed—10 *a.m. till* 1 *p.m. July* 24, 1888.

1. On what principles depends the use of the Hydrometer? Describe Nicholson's Hydrometer and explain the various purposes for which it may be used.

2. Describe and explain the Hofmann-Gay-Lussac method of determining vapour densities. Discuss its special advantages. A determination by this method gave the following data. Calculate the vapour density of the substance on the hydrogen-unity scale.

Weight of substance	0·6 gram
Volume of the vapour	54 c.c.
Temperature	100° C.
Height of mercury-column. . . .	500 mm.
Height of barometer	750 mm.
Tension of mercury-vapour at 100°	0·75 mm.

3. Describe the method you would adopt for the accurate determination of the specific gravity of acetic aldehyde (B.P. 22° C.).

4. Explain what is meant by "specific heat." How would you proceed to determine the specific heat of metallic lead?

5. Enunciate the principal laws of electrolysis. To what practical purpose has the phenomenon of "reversed electrolysis" been applied?

6. Explain the construction and use of a Nicol's prism. What is meant by the statement that "the specific rotatory power of English Oil of Turpentine is +21·5°?"

Part II.—Chemistry.

Time allowed—2 *p.m. to* 6 *p.m. July* 24, 1888.

1. Distinguish between "combining proportion," "equivalent" and "atomic weight." Selecting an illustration for yourself, show how the atomic weight of an element may be determined and verified.

The vapour density of mercury on the air-unity scale is 6·9; its atomic weight is 200. Find its molecular weight. What inference is made from the observed relation of the atomic to the molecular weight of this element?

2. Whence and how is white arsenic obtained? Why is "arsenium trioxide" an improper name for this compound?

3. Discuss the relationships and modes of preparation of the oxides and oxi-acids of phosphorus.

4. State the principal sources of bismuth. What other elements are usually associated with crude bismuth and how may they be removed?

5. Discuss the constitutional relationships of acetic acid, acetamide and aceto-nitrile. By what reactions may these compounds be mutually transformed?

6. Describe the chemical reactions which are involved in the preparation of chloral hydrate and butyl-chloral hydrate. How may these substances be chemically distinguished?

Note.—Each chemical reaction should be represented by an equation. Details of apparatus are not asked for.

Chemistry and Chemical Physics.

COURSE EXAMINATION FOR A BRONZE MEDAL AND TWO CERTIFICATES OF HONOUR.

SESSION 1887–8. SECOND COURSE.

Time allowed—10 *a.m. to* 1 *p.m. July* 25, 1888.

1. Show how pure nitrous oxide may be distinguished from (i.) a mixture of oxygen and nitrous oxide; (ii.) a mixture of two volumes of nitrogen with one volume of oxygen.

2. Give an account of the metallurgy of lead, and the preparation of silver, when argentiferous galena is used.

3. Describe and explain what happens when a strip of pure zinc and a strip of pure copper are immersed in diluted sulphuric acid (i.) separately; (ii.) together but not in contact; (iii.) in contact.

4. How is cadmium obtained? Contrast its properties with those of zinc.

5. Explain how the composition and molecular formula of acetic acid may be established. What experimental facts are expressed by the formula $CH_3CO.OH$.

6. Give an account of the methods of preparation and general characters of ordinary or ethylic alcohol and of carbolic acid or phenol. By what reactions may their constitutional similarities and differences be exhibited?

Botany.

SESSIONAL EXAMINATION FOR SILVER MEDAL AND THREE CERTIFICATES OF HONOUR.

Hours from 11 *till* 2. *July* 6, 1888.

1. Give an account of the structure of a typical flower, and show in what ways this structure may be modified.

2. What is the structure of an ovule? Describe the different kinds of ovule met with. Show what are the changes that take place as the ovule becomes the seed.

3. Give an account of the life history of a Moss. Trace out the development of the capsule.

4. Give the characteristics of the natural orders Solanaceæ and Papaveraceæ. What are the chief medicinal plants belonging to these orders?

5. *Vivâ voce* over specimens.

Hours from 3 *till* 6. *July* 6, 1888.

1. What is growth? Upon what conditions does growth depend? Give an account of the structure of a growing point.

2. Give an account of the group of plants known as the Compositæ. What sub-orders are included in this group and how do they differ from each other?

3. Give an account of the chief forms of inflorescence met with.

4. Describe the structure of a lichen.

5. Identify the microscopic specimens A, B, and C.

COURSE EXAMINATION FOR BRONZE MEDAL AND TWO CERTIFICATES OF HONOUR.

SESSION 1887–88. SECOND COURSE.

Hours from 11 *to* 2. *July* 11, 1888.

1. Give an account of the group of plants known as the Thallophyta. How are these classified? Give briefly the characteristics of each class.

2. Describe the development of the sporangium in the fern. By what mechanism are the spores caused to escape?

3. Describe the flower of the common Orchis. Compare its parts with the flower of a typical monocotyledon, such as the Lily, and account for the differences seen.

4. Give the characteristics of the natural orders Cruciferæ, Malvacæ and Labiatæ.

5. Identify the microscopic specimens, A, B, C.

Materia Medica.

SESSIONAL EXAMINATION FOR SILVER MEDAL,

Hours: 10 *to* 1. *July* 20, 1888.

1. Give the botanical source, natural order and geographical distribution of the plants yielding the three drugs placed before you, and mention the impurities or adulterations likely to be met with in each, and the means of detecting them.

2. Examine the portion of leaf placed before you under the microscope, and state from what medicinal plant it is derived.

3. Examine the powder placed before you, under the microscope, and state if it is a good sample of the drug, or if not, what impurities are present.

Hours from 2 *till* 5. *July* 20, 1888.

1. How would you ascertain the purity of Hydrochlorate of Cocaine?

2. Describe Ergot of Rye, enumerate its active principles, and state the best method of preserving the drug in good condition.

3. Name the alkaloids obtained from *Atropa Belladonna* and *Hyoscyamus niger*, and explain the relation they bear to each other.

COURSE EXAMINATION FOR BRONZE MEDAL.

SESSION 1887–88. SECOND COURSE.

Time allowed: 10 *till* 1. *July* 21, 1888.

1. State the natural orders to which the following plants belong, the part of the plant used in medicine, and the distinctive characters by which the drugs derived from them may be recognized:—*Erythroxylon Coca*, *Menyanthes trifoliata*, *Convallaria majalis*, *Podophyllum peltatum*, *Prunus Lauro-Cerasus*.

2. What are the botanical and geographical sources and the active principles of the following articles of materia medica:—Calabar beans, Tonka beans, Vanilla, Sabadilla seed, and Lobelia?

3. What are the distinguishing features of the

quilled barks of *Cinchona Calisaya*, *C. officinalis*, *C. succirubra*, *C. lancifolia*, and *Remijia pedunculata*? Explain the terms "mossed," "renewed," "quilled," "flat," "shavings," as applied to cinchona bark.

4. Give the botanical name and natural order of the specimen placed before you and describe the physical characters by which you identify it.

5. What are the botanical sources of volatile Oil of Bay, Bayberry Bark, Expressed Oil of Bay, and Bayberry Wax?

Pharmacy and Practical Pharmacy.

SESSIONAL EXAMINATION FOR SILVER MEDAL.

Time allowed—10 *to* 1. *July* 19, 1888.

1. What different temperatures are ordered in making B.P. extracts? Give definite reasons for their employment.

2. Classify the liquors of the British Pharmacopœia, and describe those of centesimal composition.

3. Explain the processes adopted in the preparation of pharmacopœial formulæ which depend upon chemical reactions.

4. Give strengths of preparations containing a morphia salt.

Time allowed: 2 *to* 5. *July* 19, 1888.

1. Note exceptional difficulties in dispensing Pills and the methods by which they may be overcome.

2. What are the chief solvents used in Pharmacy? Describe some special applications.

3. Give instances in which Spiritus Rectificatus is used as a solvent, and others in which its preservative action is mainly concerned.

4. Identify specimens 1 to 12.

COURSE EXAMINATION FOR BRONZE MEDAL.

SESSION 1887–88. SECOND COURSE.

Time allowed: 2 *to* 5. *July* 25, 1888.

1. Into what preparations do Sapo Durus and Sapo Animalis respectively enter? State the precautions to be used in making Linimentum Saponis.

2. Give the process for making Extractum Cascaræ Sagradæ; Extractum Conii; Extractum Glycyrrhizæ Liquidum and Extractum Sarsæ Liquidum.

3. Define Elutriation, Levigation, Lixiviation and Granulation, illustrating the definition by typical examples.

4. Describe the various methods which have been suggested for the preparation of tinctures.

5. Comment upon the Dispensing applications of Glycerine and Pulvis Tragacanthæ.

6. State in full the methods adopted in preparing Alkaline emulsions.

Provincial Transactions.

LEICESTER AND LEICESTERSHIRE CHEMISTS' ASSOCIATION.

The members of this Association paid a visit to the Abbey Park, Leicester, on Thursday afternoon, July 19, to inspect the botanical garden now being laid out for the use of students, etc. About a year ago Mr. Councillor Richardson, J.P., presented a petition from the Association to the Town Council pointing out the long felt want of a botanical garden in the town, and the suitability of the Abbey Park for the purpose. The request was promptly met, and Mr. J. Burn, who is always ready to afford every help to students, mapped out twenty-four beds in the prettiest part of this spacious park. The Society then applied to Professor Hillhouse, F.L.S., of Masons' College, Birmingham, who drew up a scheme embodying specimens of plants most useful to pharmaceutical students and others. On the occasion of this visit Mr. Councillor Mott, F.G.S., consented to describe the various plants to those present, Mr. J. Burn pointing out any rare specimens. The tropical and sub-tropical beds were of special interest. In the centre of the botanical garden there will be a fountain surrounded by aquatic plants. The visit was of special interest to the numerous students who attended, and a hearty vote of thanks was passed to Mr. Mott and Mr. Burn for the trouble they had taken in providing such an instructive afternoon.

Proceedings of Societies in London.

SOCIETY OF CHEMICAL INDUSTRY.

THE ERRORS AND DEFECTS OF THE PRESENT REVENUE SYSTEM OF CHARGING THE DUTY ON SPIRITS, AND THE MEANS FOR REMEDYING THEM.*

BY B. DERHAM, M.D.

The present revenue system of charging the duty upon spirits comprises Sikes' hydrometer, the range of which, with nine weights or poises and as many repetitions of the scale, extends from specific gravity ·8154 to 1·0007; a series of tables, one for each degree of temperature from 30° to 80°, denoting the strengths or relative values of spirits to proof spirit corresponding to the indications of the instrument; and a short specific gravity table giving the specific gravities also corresponding to the indications of the instrument, and said to be determined at a temperature of 62° F. When constructing his tables of strengths, Sikes made the erroneous assumption that any specified quantity of spirit at the temperature of 51° F. retained the same bulk and the same strength whether heated to 80° or cooled to 30°. In practice, however, by the operation of the natural law, a very considerable augmentation in bulk takes place in spirit heated from 30° to 80°, whilst by the arbitrary principle of construction of the tables the strength remains the same. We have, therefore, according to the revenue system, a larger quantity of spirit of the same strength by merely heating the spirit, which is absurd. The limit of the error in this direction to which the revenue system is liable will be found in pure alcohol, the strength of which at 51° is 75·3 over proof, and which is assumed not to vary. One hundred gallons of alcohol at 51° F. contract to 98·9 gallons at 32°, and expand to 101·8 gallons at 80°, which, reduced to their equivalent value in proof gallons in the usual manner, are:—

At 32° . . 98·9 × 1·753 = 173·4 gallons of proof.
At 51° . . 100·0 × 1·753 = 175·3 ,,
At 80° . . 101·8 × 1·753 = 178·5 ,,

and the results, although we are dealing with the same actual quantity of spirit, exhibit a total discrepancy of over five gallons.

Such incongruous results are sufficient demonstration that the principle of construction of the tables is radically wrong; nevertheless, since it is a common impression that the strength at different temperatures must be the same, seeing that the spirit is identical, we will examine this point a little more closely. We want, in the first place, a definition of the expression "strength of spirits." Spirits are mixtures of alcohol and water in varying proportions, the alcohol alone having any commercial value. The expression "strength of spirits," therefore, must denote the relative proportion of alcohol contained in any specified spirit as compared with that contained in an accepted standard spirit, a definite unit of bulk of the standard strength being employed for the purpose of instituting the comparison.

* Read at a meeting of the London Section of the Society of Chemical Industry, April 9. From the Society's Journal.

The accepted standard in Great Britain is called proof spirit, which has a specific gravity of ·9236 at 51° F., and 1 gallon of which contains 4·553 lbs. of alcohol of specific gravity ·79385 at 60°. Now let us for a moment confine our attention to the consideration of the changes affecting one gallon of proof spirit when the temperature varies from 51°. Should the temperature be raised to 80° the gallon of spirit expands by one-hundredth part of its bulk; a gallon, therefore, at the new temperature no longer contains 4·553 lbs. of alcohol, for there is one-hundredth of a gallon extra, also containing its share of the alcohol. A gallon of spirit, therefore, which was proof at 51° is evidently under proof at 80°, since it contains less than the prescribed weight of alcohol. By a similar course of reasoning it will be seen that spirit which is proof at 51° is over proof at 30°, and that, of necessity, the strength of all spirits must vary with the temperature, being increased at temperatures below and decreased at temperatures above 51° F. The essential defect of Sikes' tables, namely, that the strength of spirit is assumed not to vary with temperature, is readily shown by reference to Sikes' own tables and to the record of Gilpin's experiments, upon which Sikes' tables profess to be founded. The connection between Gilpin's specific gravities and Sikes' strengths must be traced through the specific gravity table annexed to Sikes' tables of strengths. To trace the connection, first find, in the specific gravity table, the indications of Sikes' instrument corresponding to their respective specific gravities, and then in the table of strength, at the appropriate temperature, the strength corresponding to these various indications. I subjoin several tabular illustrations, exhibiting in parallel columns, so that the connection may be traced at a glance, first, the specific gravities of certain definite mixtures of Gilpin's pure spirit and water at every fifth degree of temperature from 30° to 80°; next, the corresponding indications of Sikes' instrument; and lastly, Sikes' corresponding strengths.

	Spirit = 100. Water = 0.			Spirit = 100. Water = 5.			Spirit = 100. Water = 20.		
	Gilpin's specific gravities.	Sikes' indications	Sikes' strengths.	Gilpin's specific gravities.	Sikes' indications.	Sikes' strengths.	Gilpin's specific gravities.	Sikes' indications.	Sikes' strengths.
30°	·83896	13·8	62·0 O.P.	·84995	20·3	56·0 O.P.	·87585	35·0	40·8 O.P.
35	·83672	12·6	62·0 ,,	·84769	18·9	56·2 ,,	·87357	33·7	40·9 ,,
40	·83445	11·3	61·9 ,,	·84539	17·7	56·1 ,,	·87134	32·4	41·0 ,,
45	·83214	9·9	62·0 ,,	·84310	16·3	56·1 ,,	·86907	31·1	41·0 ,,
50	·82977	8·5	62·0 ,,	·84076	14·9	56·3 ,,	·86676	29·8	41·1 ,,
55	·82736	7·1	62·1 ,,	·83834	13·5	56·3 ,,	·86441	28·5	41·1 ,,
60	·82500	5·7	62·1 ,,	·83599	12·1	56·3 ,,	·86208	27·2	41·1 ,,
65	·82262	4·2	62·2 ,,	·83362	10·8	56·3 ,,	·85976	25·9	41·0 ,,
70	·82023	2·8	62·2 ,,	·83124	9·4	56·2 ,,	·85736	24·5	41·1 ,,
75	·81780	1·4	62·1 ,,	·82878	7·9	56·3 ,,	·85493	23·1	41·1 ,,
80	·81430	0·0	62·0 ,,	·82631	6·4	56·3 ,,	·85248	21·6	41·2 ,,

	Spirit = 100. Water = 40.			Spirit = 100. Water = 60.			Spirit = 100. Water = 80.		
	Gilpin's specific gravities.	Sikes' indications.	Sikes' strengths.	Gilpin's specific gravities.	Sikes' indications.	Sikes' strengths.	Gilpin's specific gravities.	Sikes' indications.	Sikes' strengths.
30°	·90054	48·5	24·1 O.P.	·91847	58·2	10·7 O.P.	·93191	65·3	·2 U.P.
35	·89839	47·4	24·2 ,,	·91640	57·1	10·7 ,,	·92986	64·2	Proof
40	·89617	46·2	24·2 ,,	·91428	56·0	10·7 ,,	·92783	63·1	Proof
45	·89396	45·0	24·4 ,,	·91211	54·8	10·9 ,,	·92570	62·1	Proof
50	·89174	43·7	24·5 ,,	·90997	53·7	10·9 ,,	·92358	61·0	Proof
55	·88945	42·5	24·4 ,,	·90768	52·5	10·9 ,,	·92145	59·8	·2 O.P.
60	·88720	41·3	24·4 ,,	·90549	51·3	10·9 ,,	·91933	58·7	·1 ,,
65	·88490	40·0	24·5 ,,	·90328	50·1	11·0 ,,	·91715	57·5	·2 ,,
70	·88254	38·7	24·5 ,,	·90104	48·9	11·0 ,,	·91493	56·3	·2 ,,
75	·88018	37·4	24·5 ,,	·89872	47·6	11·0 ,,	·91270	55·1	·3 ,,
80	·87776	36·1	24·5 ,,	·89639	46·3	11·0 ,,	·91042	53·9	·2 ,,

	Spirit = 100. Water = 100.			Water = 100. Spirit = 70.			Water = 100. Spirit = 45.		
	Gilpin's specific gravities.	Sikes' indications.	Sikes' strengths.	Gilpin's specific gravities.	Sikes' indications	Sikes' strengths.	Gilpin's specific gravities.	Sikes' indications.	Sikes' strengths.
30°	·94222	70·7	9·5 U.P.	·95681	78·2	24·8 U.P.	·96967	84·8	43·5 U.P.
35	·94025	69·7	9·4 ,,	·95502	77·2	24·2 ,,	·96840	84·1	42·6 ,,
40	·93827	68·6	9·2 ,,	·95328	76·4	24·2 ,,	·96706	83·4	42·3 ,,
45	·93621	67·6	9·1 ,,	·95143	75·4	23·9 ,,	·96563	82·7	42·0 ,,
50	·93419	66·5	9·0 ,,	·94958	74·4	23·6 ,,	·96420	82·0	41·9 ,,
55	·93208	65·4	9·8 ,,	·94767	73·5	23·7 ,,	·96272	81·2	41·7 ,,
60	·93002	64·3	8·8 ,,	·94579	72·5	23·7 ,,	·96122	80·4	41·7 ,,
65	·92794	63·2	8·8 ,,	·94388	71·5	23·7 ,,	·95962	79·6	41·8 ,,
70	·92580	62·1	8·9 ,,	·94193	70·6	24·0 ,,	·95802	78·8	42·0 ,,
75	·92364	61·0	9·1 ,,	·93989	69·4	23·9 ,,	·95638	78·0	42·4 ,,
80	·92142	59·8	9·2 ,,	·93785	68·4	24·2 ,,	·95467	77·1	42·7 ,,

The resulting strengths, it will be observed, are in one or two of the samples practically uniform, and these examples sufficiently establish the principle underlying the construction of the tables; but when we come to examine more closely the other examples, we discover so many irregularities that we are justified in inferring that Sikes did not proceed on any exact or scientific method, but was compelled to trust to experimental determination with an instrument notoriously unfitted for obtaining accurate results, particularly in liquids approaching the specific gravity of water. It will be observed on examination that some of these variations from the principle of the tables amount to 1 per cent., and that, contrary to what we know to be the facts of the case, the strengths are almost uniformly greater at the higher than at the lower temperatures, consequently their effect will be to augment the discrepancies springing from the fundamental error of the tables.

We will now pass to the consideration of the specific gravity table, which forms part of the revenue system of estimating the value of spirits. The chief utility of specific gravities to the revenue official is in ascertaining the contents of casks. One gallon of distilled water at 62° weighs ten pounds, consequently if the specific gravities be multiplied by ten, that is if the decimal point be placed after the first figure on the left, the specific gravity of a spirit expresses the weight in pounds of a gallon of that spirit; therefore if the nett weight of spirit in a cask be divided by the specific gravity, punctuated as described, the quotient represents the contents of the cask in gallons. To be accurate, I should here point out that whilst it is established that one gallon of distilled water weighs ten pounds at 62°, the specific gravities are compared with distilled water at 60°, consequently the specific gravities do not *exactly* represent the pounds weight per gallon; but the difference is so small as to be inappreciable, it certainly does not affect the result in the quantities usually dealt with. The specific gravity table was ascertained by experiment, long after the first promulgation of Sikes' tables, in the following manner:—

A delicate hydrometer was provided on the model of what is commonly known as Nicholson's hydrometer, otherwise the hydrometer of constant immersion, since in employing the instrument it is always sunk by means of weights placed in the little cup at the top of the stem to a fixed point on the stem: the bulk, compared, therefore, is constant. It was contrived that the total weight of the instrument and weights in the cup, when floating in distilled water and immersed to the fixed point on the stem, should be 1000 grains; the instrument itself weighing 700 grains, and the weight in the cup 300 grains. Hence, when floating in other liquids and immersed to the same point, the total weights of instrument and weights in the cup at once represented the specific gravities of the liquids. This instrument and a carefully-adjusted revenue hydrometer were floated together in samples of spirit, corresponding to the chief divisions of the stem of Sikes' hydrometer, and the specific gravities belonging to these latter thus ascertained. The results obtained were interpolated for the minor divisions of the scale, and the whole arranged in a tabular form. In commenting upon this specific gravity table, I may remark that the experimenters appear to have begun and carried on their operations to a certain point at the temperature of 62°, with the design that the specific gravity of their table, corresponding to the water point of Sikes' hydrometer, should exactly represent 10 pounds per gallon, when it suddenly occurred to them that, owing to the restrictions imposed by the definition of proof spirit, with which Sikes' hydrometer strictly complied, the series should terminate at the specific gravity or pounds weight per gallon of distilled water at 51° F., namely, 10·007 instead of 10, the pounds weight per gallon of distilled water at 62°. Without any regard to consistency or scientific accuracy, the original design of completing the table at a temperature of 62° was abandoned, 10·007 was adopted as the specific gravity corresponding to the water point, and the remaining interval of the gravities arbitrarily interpolated. Now, since they were so solicitous that the gravity at the water point should be 10·007, it was equally incumbent upon them to take care that the gravity at the proof point should be, according to the definition of proof, twelve-thirteenths of 10·007, namely, 9·237, whereas in the table it is given as 9·233.

In fact, to be consistent and true, since the original design of finishing with specific gravity 10 at the water point was abandoned, all the experiments should have been re-performed at the temperature of 51°, but this was not done. In addition to these glaring inconsistencies, since the accuracy of the table ultimately depended upon the fidelity with which the revenue instrument employed had been copied from Sikes' original model, and since at the best the hydrometer of variable immersion is wholly inadequate to exact scientific determination, for several reasons which I need not dwell upon here, the entire table is incorrect; the specific gravities cannot be reconciled to the theory of any hydrometer, the error sometimes amounting to two subdivisions of the stem. This is not in itself a matter of much moment, still it is worth recording when we bear in mind that if an excise officer were detected and reported for making a mistake of those dimensions he would incur the severe displeasure of the Board of Inland Revenue. But these errors occurred with an instrument carefully prepared and verified for the purpose of these experiments. What then must we think of the correspondence likely to obtain between the indications of the instruments as ordinarily manufactured for commercial purposes and the specific gravities given in this table?

When I first began the preparation of this paper I intended to touch upon the theory of hydrometers constructed on the principle of the revenue instrument. I soon found, however, that the subject could not be conveniently comprised within the limits of a paper such as I have entered upon. I must, therefore, refer those who may be curious about this subject to a small work which I have published, where I have entered, in detail, into the theory of Sikes' hydrometer.

The following series of propositions constitute a brief summary of the indictment of the present system:—That Sikes, reversing all scientific method, first provided this hydrometer and then conducted his tables of strengths by experiments with it; that none of the valuable data accumulated by Gilpin in his celebrated experiments were utilized, except at the single temperature of 51° F.; that even at this, the standard temperature, Gilpin's and Sikes' values do not correspond, so that Gilpin's were chiefly serviceable as a means of checking Sikes' own experiments, rather than as furnishing the foundation of his table; that the tables of strengths for all other degrees of temperature were ascertained by the simple plan of heating and cooling carefully-prepared samples of spirits to the requisite temperatures, and then noting the corresponding indications of his instrument, the tables being completed by interpolating the intervals; that in these operations the expansion and contraction of spirit due to variations of temperature were neglected; that the strengths of a spirit at different degrees of temperature were erroneously assumed to be constant, and consequently that the estimate of the equivalent value of a specified quantity of spirit, in gallons of proof spirit, is different at every degree of temperature; and finally that the specific gravity table was also ascertained by

experiment with an instrument, a remote copy of Sikes' original model, and that the specific gravities it contains are referable to distilled water at different degrees of temperature, namely, 62° and 51° F.

The following features, on the contrary, should characterize a perfect system:—(1) The utilization of the material afforded by Gilpin's experiments, which are of undisputed authority to this day, and in which the specific gravities of definite mixtures of spirit and water were ascertained by the weighing bottle, the most exact means of determination at our disposal. (2) The adoption of tables of strengths, derived from such a source, in which the strengths are given corresponding to their natural allies, the specific gravities, and in which the correspondence is absolutely and finally established, and quite independent of the arbitrary and varying indications of an instrument liable to so many defects as the revenue hydrometer. (3) The employment, for commercial purposes, of a hydrometer founded upon scientific principles, the indications of which are themselves the specific gravities, and capable of prompt verification at any point of the indicated series.

(*To be continued.*)

Review.

ANALYTICAL EXERCISE FORMS for Chemical Students. Arranged by H. BELCHER THORNTON.*

These forms are convenient in some respects, and set out the results of an analysis of a simple salt (for which only they are adapted) in a neat and concise but very complete form. They might be useful at first to a beginner in analysis by inducing methodical and systematic work, but a continued use of them would have the drawback of tending to encourage a too narrow view of the subject. A better knowledge of the properties of salts and general principles of analysis is arrived at by occasionally modifying the methods of procedure, and for purposes of study the use of a stereotyped system is apt to confine the knowledge acquired too much to a particular groove.

Such tables are, however, admirably adapted for showing at a glance the work done, and so would prove very useful and convenient for purposes of examination. The present tables would have been better for a little revision of the proofs, there being two or three formulæ misprinted out of about a dozen.

BOOK RECEIVED.

THE EXTRA PHARMACOPŒIA, with the Additions introduced into the British Pharmacopœia, 1885. By WILLIAM MARTINDALE, F.C.S., etc. Medical References and a Therapeutic Index of Diseases and Symptoms by W. WYNN WESTCOTT, M.B. Lond. Fifth Edition. London: H. K. Lewis. 1888. From the Authors.

Obituary.

Notice has been received of the death of the following:—

On the 22nd of July, Mr. Joseph Phillips Mellin, Chemist and Druggist, Belgrave Road, Dresden. Aged 58 years.

On the 22nd of July, Mr. William Anthony Scorer Newby, Chemist and Druggist, Wolsingham, Durham. Aged 69 years.

On the 22nd of July, Mr. James Thomas, Pharmaceutical Chemist, Bridge, near Canterbury. Aged 68 years. Mr. Thomas had been a Member of the Pharmaceutical Society since 1853.

On the 23rd of July, at Chiswick, Mrs. Humpage, widow of the late Mr. Benjamin Humpage, Pharmaceutical Chemist. Aged 90 years. Mrs. Humpage was a subscriber to the Benevolent Fund, in which she took a great interest.

On the 20th of February, at Melbourne, Victoria, of enteric fever, Mr. Charles Fryer, Pharmaceutical Chemist. Mr. Fryer was Junior Bell Scholar and a Prize-man in the School of Pharmacy in the Session 1869–70.

On the 17th of July, Mr. Henry Thompson, Chemist and Druggist, Sunninghill Road, Lewisham. Aged 63 years. Mr. Thompson was for many years a representative of Messrs. Meggeson and Co.

* London: H. Silverlock, 92, Blackfriars Road.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE MINIMUM SIZE OF PILLS.

Sir,—I agree with Mr. Ince (see the editorial note, p. 51, last week) that British dispensers should unite in adopting a uniform weight for pills, the size of which, owing to the dose being necessarily minute, is left to the discretion of the dispenser.

Mr. Ince advises the adoption of the continental plan of adding so much excipient as may be sufficient to make a 2-grain pill. I decidedly object to this large increase in size, above what is necessary in many cases, when such substances as morphine, strychnine, arsenious acid, etc., are ordered. I know many fastidious ladies who object to so large a pill as 2 grains, and some physicians specially order their pills to be made much smaller than this. In fact, the unwritten law with London dispensers since I read a paper on "Pill Excipients" at the Liverpool Meeting of the British Pharmaceutical Conference (Mr. Ince, I think, was present), has been the adoption of a 1-grain minimum size. I there stated (*Pharm. Journ.*, Nov. 19, 1870, p. 412), "For the sake of uniformity in dispensing, I think as small doses and active principles are now so much in vogue, that unless specially required, the active ingredients and excipient together in each pill should not, in any case, weigh less than one grain; that is, if, say a quarter of a grain of hydrochlorate of morphia were ordered to be made into a pill, three-quarters of a grain of excipient should be used."

Mr. W. J. Halliday, in a paper read before the Manchester Chemists and Druggists' Association (*Pharm. Journ.*, March 18, 1871, p. 742), also favours the same. He says: "Minute pills, containing one-eighth or one-fourth of a grain of alkaloid might be increased with advantage to a standard size of one grain by the addition of sugar of milk."

Again, in another place ('Extra Pharmacopœia') I say: "Unless specially ordered otherwise, when the ingredients prescribed for each pill weigh less than one grain, it is a rule with dispensers, for uniformity's sake, to triturate the ingredients with sugar of milk and glycerine of tragacanth *q.s.* to make each pill weigh one grain."

I think, therefore, the one-grain size should be accepted, else we shall play into the hands of the pill vendors who draw special attention to their parvules and pilules as being easily swallowed.

New Cavendish Street, W. W. MARTINDALE.

E. W. Taylor.—(1) *Galium verum.* (2) Umbelliferous plants can only be safely named if in fruit: probably *Daucus Carota.*

Hedera Helix.—Try a careful application of hydrogen peroxide.

T. J.—*Polygala vulgaris.*

A. W. Willmott.—*Bupleurum rotundifolium.*

W. J. Sheppard.—(1) *Lastræa dilatata.* (2) Probably *Angelica sylvestris*: impossible to determine from leaf alone. (3) *Centaurea scabiosa.* (5) *Carex paniculata.* (6) *Arrhenatherum elaticus.*

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Mumbray, Goldschmidt, Ekin, Freeman, Bennett, Stanford, Pater Famil.

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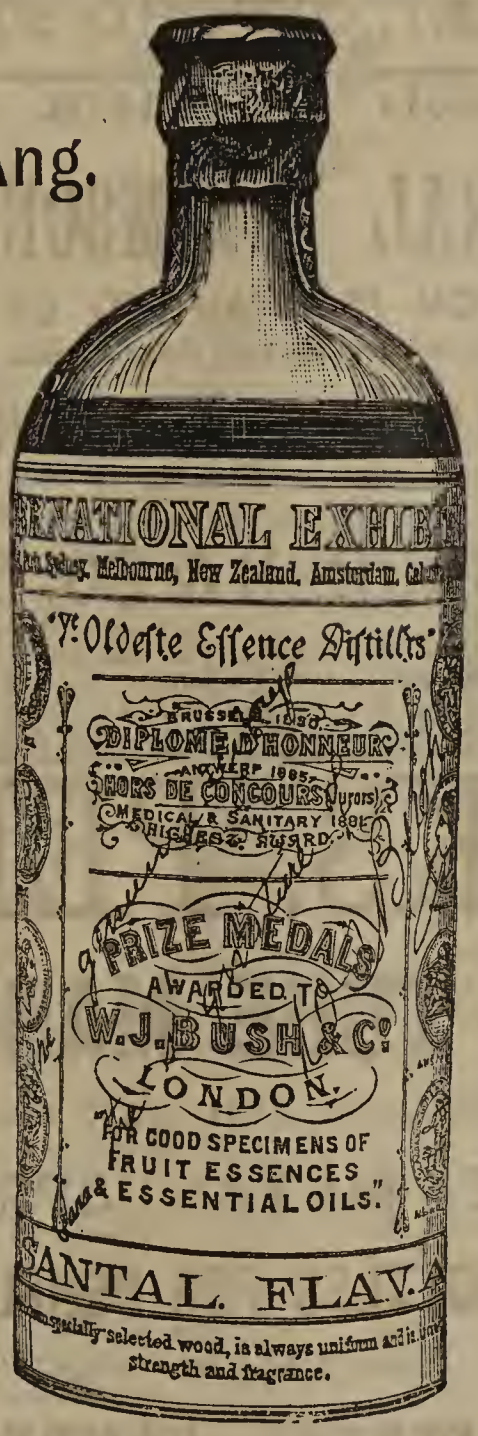

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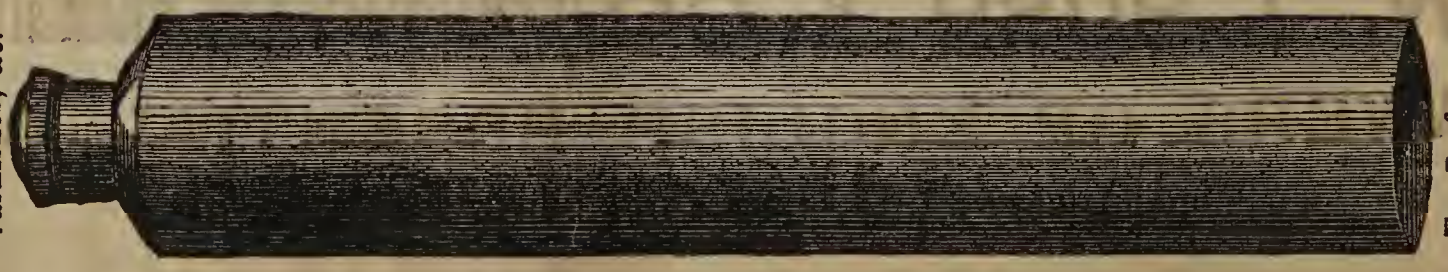

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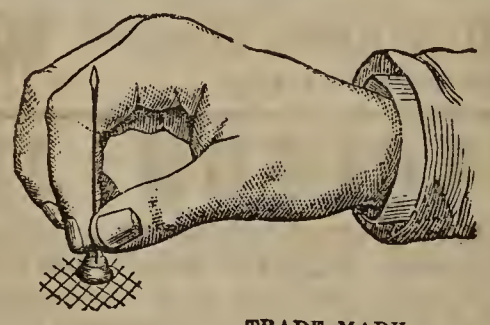

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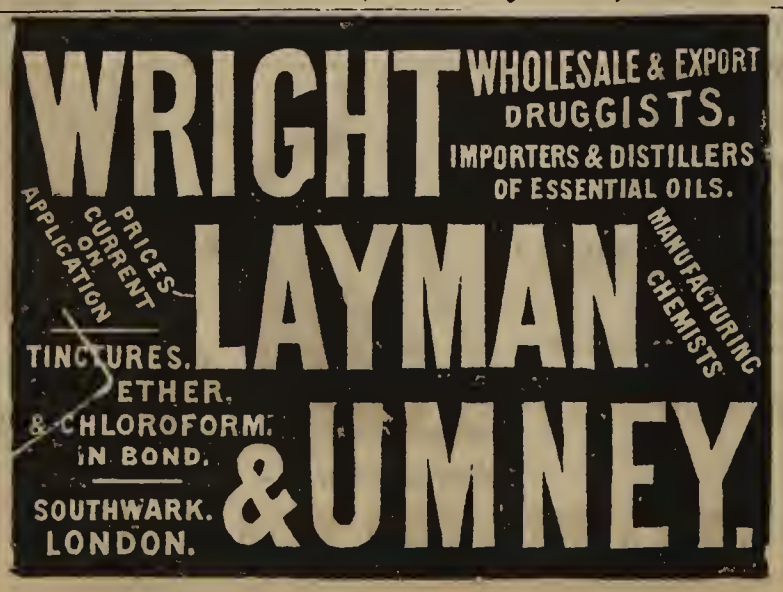

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

SPECIAL NOTICE.

The Society's Libraries and Museums in London and Edinburgh will not be open in the evening during August and September. The Library and Museum in London will be closed during the first fortnight in September. The Library and Museum in Edinburgh will be closed from August 20th to September 4th, both dates inclusive.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

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OF THE

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BY PROFESSOR WYNDHAM DUNSTAN.

The Lectures will begin on Monday, October 1st, at 9 a.m., and be continued on the first three days of each week.

PRACTICAL CHEMISTRY

BY PROFESSOR ATTFIELD.

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BOTANY

BY PROFESSOR GREEN.

The Lectures will begin on Friday, October 5th, at 9 a.m., and be continued on the last two days of each week.

MATERIA MEDICA.

Demonstrations will be given by Mr. E. M. Holmes, the Curator of the Museum, on Thursdays, at 10 a.m., commencing on October 4th.

PHARMACY AND PRACTICAL PHARMACY.

Lectures and Demonstrations will be given every week by Mr. Joseph Ince, on Tuesdays, Thursdays and Fridays at 5 p.m., commencing on October 2nd. Laboratory work in Practical Pharmacy will be carried on from 3 to 6 p.m. on Mondays and Wednesdays.

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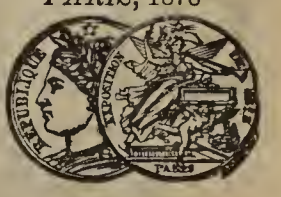

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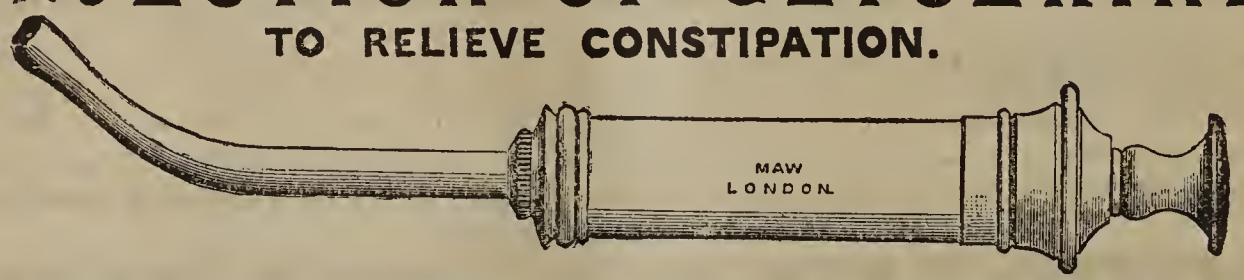

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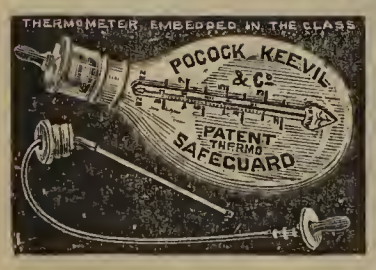

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THE GLASGOW EXHIBITION.

Although the International Exhibition now open in the city of Glasgow is entitled to rank high among enterprises of that class, it is singularly lacking in representations of pharmaceutical products. It is true that among the exhibits of chemicals, and in other courts, many articles are to be found that are handled by chemists and druggists, but as a rule these occur in cases that appeal principally to the followers of other industries, such as calico printing, dyeing, food purveying, etc. Even in the two or three exhibits actually shown by British pharmaceutical firms perfumery and aerated waters are predominant. This is the case in the exhibit of the Glasgow Apothecaries' Company (No. 816), which is avowedly devoted to "perfumery, including pomades, essential oils, extracts, and other articles used in the manufacture of various perfumes," as well as in that of Frazer and Green, of Glasgow (No. 801), which, although containing some few pharmaceutical preparations, represents principally perfumery and aerated waters. On the other hand, the development of wholesale pharmacy, which in the opinion of some threatens to rank true pharmacy with the dodo and other extinct things, is well represented in the case of Burroughs and Wellcome, of London. It is not pleasant to say, but it is nevertheless true, that perhaps the most conspicuous exhibit connected with practical pharmacy in the whole exhibition is an announcement to be found painted on one of the kiosks in the grounds, to the effect that prescriptions are dispensed at half price and drugs supplied at wholesale prices at certain establishments in Glasgow. This fact notwithstanding, however, there are many cases in the Glasgow Exhibition that present features of special interest to pharmacists, and to some of these it is now proposed to refer.

It may be convenient to state that most of the exhibits to which reference will be made are to be found in Courts 7, 8, 9 and 10, which are devoted to "Chemistry and Apparatus, Processes and Appliances connected with Applied Chemistry and Physics, Philosophical Instruments and Apparatus." These courts are situated on the right hand side of the transverse avenue approached from the principal entrance, commencing at the angle formed where it is crossed by the main avenue. In passing through these courts one can hardly help observing that the exhibits are as a rule rigidly confined to the display of finished products under certain names, without any attempt to give information as to methods of manufacture or even as to the special characters of the articles shown, other than statements in respect to their excellence over rival products. The cases, in fact, approximate to more or less artistic hoardings set up for the display of certain "firm" names, the owners of which cannot afford to be obscured by the advertising of more energetic competitors. The consequence is that, except in cases where the articles lend themselves to a pretty and attractive arrangement, too frequently an exhibit fails to receive any attention from the ordinary visitor and even to the expert is to a considerable extent as mysterious as a sealed book. It must be confessed, however, that the few cases wherein interesting explanatory information is to be found, do not appear to be more successful than others in arresting the aimless wanderings that ordinarily constitute a visit to an exhibition.

In the first place, the most recent advances in several branches of chemistry are well represented, and among other instances several of the compounds that have been introduced into medicine recently are shown. One of these is "sulphonal," the new hypnotic, which will be found in the case (No. 724) of Bayer and Co., of Elberfeld. This compound, which has been described in this Journal (April 28, p. 901), is diethylsulphonedimethylmethane, or a methane in which the four atoms of hydrogen are replaced by two methyl and two ethylsulphone groups. The properties of this compound seem to have been ascertained during an investigation into the manner in which certain organic compounds containing sulphur are decomposed in the animal organism, undertaken by Professors Kast and Baumann. The view of these observers is that the principal merit of sulphonal is not that it acts invariably as a soporific, but that it belongs to the group of substances which promote the normal periodical tendency to sleep, and induce slumber where that fails naturally. The same firm also shows what is claimed to be "chemically pure methylen chloride." It may be remarked, however, that according to the recent testimony of eminent surgeons this chemically pure compound is not the preparation which renders best service as an anæsthetic, although the reputation of the latter was first gained under a similar name. Phenacetin is also shown in the case of Bayer and Co., as well as in that of May and Baker, of Battersea (No. 797), who are their agents for the preparation. Phenacetin, or paracetphenetidin, which has already been described in this Journal (xvii., 887; xviii., 458), is the ethylic ether of paramidophenol. Reference was made very recently (June 2, p. 1005) to some favourable reports as to the value of this compound as an antipyretic, and it has since been further stated that a dose of half a gram gives prompt relief in cases of neuralgia. In consequence of the relative insolubility of this compound it appears to be most conveniently administered in the dry form, as in wafers. But in view of this property of the compound at present sent out under the name, it may be useful to mention that a short time since Dr. Dujardin-Beaumetz called the attention of the Paris Therapeutical Society to two other varieties of phenacetine, the meta- and the orthoacetphenetidin, and gave some information respecting them (*Archives*, July 5, p. 290). Metacetphenetidin, which melts at 97° C. (paracetphenetidin melting at 135° C.), was described as being medicinally nearly inert. On the other hand, orthoacetphenetidin, which melts at 79° C., was stated to act similarly, in the same doses, to paracetphenetidin, the compound ordinarily met with, but as the ortho compound is more soluble in alcohol than either of the others, it was suggested that this property might render possible to some extent its admixture with water. The better-known antifebrin, or acetanilid, which is a closely related compound, will be found, together with salol, in the case (No. 742) of B. Kühn and Schröder, of Manchester. "Antifébrin," presumably of French manufacture, is also shown by the St. Denis Chemical Company, of Paris (No. 745).

Some other novelties, and a number of com-

pounds interesting to pharmacists, will be found in the handsome case of May and Baker, of Battersea (No. 797). Nickel bromide, which has been recommended lately as a hypnotic and sedative ; phenol mercury, the new antisyphilitic ; and zinc cyanide, which has recently been applied in the treatment of cardiac disease, are among those that were noticed. But probably the most striking feature in the case is found in the fine specimen of metallic bismuth and the full series of bismuth compounds, which includes the oxide, oxycarbonate, oxychloride, oxyiodide, subnitrate, nitrate, phosphate, citrate, ammoniocitrate, salicylate and tannate. The mercurial compounds are represented by the subchloride, perchloride, oxychloride, basic sulphate, persulphate, arseniate, cyanide, iodide, bromide and salicylate. Benzoic acid and benzoates, pyrogallic and gallic acids are also shown. Exhibits labelled picrate of ammonia and picrate of zinc were observed, but it is not quite clear how the presence of those compounds in the solid form could be reconciled with the existing stringent regulations as to the keeping of picrates. Messrs. May and Baker also show a number of flavouring essences.

Another case to which pharmacists will naturally turn on account of its contents is that of Howards and Sons, of Stratford (No. 766). Here will be found the fullest, if not the only series of cinchona alkaloids, including quinine and its sulphate, hydrochlorate, phosphate, hydrobromate, valerianate, citrate and salicylate ; cinchonine and its "muriate ;" and salts of quinidine and cinchonidine. There is also a good display of mercurial compounds, specimens of compressed camphor, terebene and other pharmaceutical chemicals. Galenicals are represented by liquid extracts of cinchona (calisaya and succirubra), liquid extract of coca and aromatic spirit of ammonia.

In the case of the North British Chemical Company (No. 755) may be seen iodine and potash salts derived from sea-weed. There is a very fine sample of the resublimed metalloid, as well as specimens of several iodine compounds, such as the golden-yellow iodide of lead, the red biniodide of mercury, crystals of herapathite, iodic acid and iodoform. In addition there are caustic soda, chlorate of potash, bleaching powder, besides charcoal, "coke," pitch and tar presumably obtained in the destructive distillation of sea-weed.

Another very interesting product obtained from sea-weed may be seen in the adjoining case of the Algin Company of Clydebank, B.B. It will be remembered that "algin" is the name given by Mr. E. C. C. Stanford to a nitrogenous organic acid obtained by him from sea-weed, and also called "alginic acid," which seems to present some analogies to albumen. The acid is insoluble in water and in dilute mineral acids, and as it can be produced in thin transparent sheets it will probably find applications in this form ; indeed, it has been put forward as a substitute for gold-beaters' skin, bladder, and vegetable parchment. The acid combines to form "alginates," some of which are also insoluble, but the sodium, potassium, ammonium, lithium and magnesium compounds are soluble and others are very soluble in ammonia. It is however the sodium alginate that is referred to in the catalogue as "pharmaceutical algin, a substitute for gum." In a paper read before the Society of Chemical Industry in April, 1886, Mr. Stanford described this compound as an "acid alginate," having an acid reaction. It contains about 8 per cent. of sodium, that being the least proportion required to render it soluble. It dissolves slowly and is at once coagulated by nearly all acids, except acetic acid, and by alcohol, but not by heat, and it does not gelatinize. All the alkaline earths are precipitated by it, except magnesium, and all the metals, except mercury as mercuric chloride. So far as pharmacy is concerned it is now recommended "for making organic compounds with alkaloids and metallic bases for use in medicine ; also as a substitute for gum arabic and tragacanth, albumen and gelatin." Besides "alginic acid" and various "alginates," all more or less resembling dry sheets of gelatine, there were noticed in this case "alguloid," a substitute for "ivory nut" and bone, "oleo-algin," a waterproofing material, and "algulose," described as a new paper material.

(*To be continued.*)

THE DETERMINATION OF THE AMOUNT OF MORPHINE IN OPIUM.

BY D. B. DOTT, F.R.S.E., F.I.C.

In two recent numbers of the *Chemical News** Messrs. Teschemacher and Smith indulge in a pretty free criticism of nearly all the recognized methods of opium assay, including that of the British Pharmacopœia. Some of the axioms and rules laid down by these writers may be accepted as sound, but others of them are certainly open to dispute. At the outset all processes in which a considerable proportion of alcohol is present when the morphine is precipitated are condemned, and justly so, chiefly because of the serious loss of alkaloid in the mother liquors. At the same time it is surely unjustifiable to brand as "an unpardonable sin in an analyst" the adding of a constant number to the weight actually obtained, in order to represent the loss in filtrate and washings. This custom is described "as tampering with the actual results, and thus leading directly to untrue and fallacious returns." Nevertheless, it is a custom commended by so great an authority as Fresenius, for example, in the estimation of magnesium by precipitation as ammonic phosphate. In the estimation of certain glucosides such an allowance is practically compulsory. The related processes of Flückiger, Squibb and Stillwell, have proved to Messrs. Teschemacher and Smith a source of innocent merriment, more particularly what they are pleased to call "Squibb's law," viz., that his process *will give results which are almost exactly comparable amongst themselves.* Yet assuredly it is a matter of much importance that a process should give consistent results. It would indeed be scarcely too much to say that such a process is a sound one, provided the results are correctly interpreted.

This brings us to a consideration of the process of the British Pharmacopœia, a process which is somewhat severely criticized in the paper referred to. Messrs. Teschemacher and Smith evidently to some extent misunderstand the scope of the Pharmacopœia. The process for estimating the morphine in opium is only intended to fix the strength of the opium which is to be used in making the official preparations. It would not necessarily be held by a court of law to be the right way of determining the value of opium in case of a com-

* Vol. lvii., 93 and 103. See before, July 21, p. 44.

mercial dispute. In this connection it may be admitted that the compilers of the Pharmacopœia have made a mistake in permitting alternative processes which might yield discordant results. Our critics cannot understand why 1040 grain measures of the filtrate from the lime precipitate are directed to be taken, and not 1000, as they would expect, to represent 100 grains of the opium. I have heard the same remark from others. Now, it is surely evident that if the volume of the added water is increased by the substances which pass into solution, an allowance must be made for that increase. Hence, in the case of the Pharmacopœia process, we must take more than 1000 fluid grains to obtain the equivalent of 100 grains opium. Whether 40 grain measures really represent the increase on the 1000 grains may possibly be open to doubt, but the number cannot be far wide of the mark. The amount must necessarily vary a little with different samples of opium. The number has doubtless been accepted on the authority of Mr. Conroy, whose valuable paper* preceded the introduction of the present official process. After some critical remarks of minor importance, we have the following: "The crushing conclusion remains that a process which ought to be trustworthy signally fails when put to the proof by probably the most practised hands in the kingdom. It has yielded 9·4 to 9·6 per cent. of morphia with an opium which has, over and over again, afforded us 11·20 per cent. Moreover, whilst we are very sure that our 11·20 per cent. is pure morphia, we have no such conviction, but rather grave doubts, whether the Pharmacopœia method yields or is expected to yield pure morphia. If so, whence that odd provision of a margin of 9½ to 10½ grains?—*i.e.*, a difference of some 10 per cent. in the results permitted, probably expected." This criticism is far too sweeping. Assuming for the nonce that the Teschemacher process yields absolutely correct results, we simply arrive at the fact that there is a loss of about 1½ grains of morphine in the official process. Mr. Conroy found that even when operating with pure morphine there was a loss in mother-liquor and wash water of about 1 grain of morphine, so that it would not be very surprising that the loss in the case of an impure solution should amount to 1·6 grains. My own experience, however, of several processes would lead me to the conclusion that the loss of alkaloid in the Pharmacopœia method amounts to something under 1·6 grains. The provision as to the morphine precipitate amounting to 9½–10½ grains is, of course, intended to allow a certain latitude in the quality of the opium, not that the process was considered so faulty as to yield vague results. We may agree that the use of lime is open to some objections, without admitting the very grave charge brought against its use by Messrs. Teschemacher and Smith, "that as sal ammoniac precipitates lime when added to such a solution as yielded by the Pharmacopœia process, and the precipitate is washed with distilled water, this water will dissolve the lime, which in its turn will dissolve the morphia, and thus be one cause of the large loss of morphia involved in the use of the process of the British Pharmacopœia." That is a statement I could not accept without the clearest experimental proof. It is highly improbable that ammonium chloride should precipitate calcium hydroxide, and I never observed anything to indicate that such an action occurs. It is true that on dissolving the morphine precipitate (of the Pharmacopœia method) with dilute acetic acid a minute precipitate is produced by oxalate of ammonium. This precipitate I have always regarded as being due to a trace of carbonate or possibly basic meconate of lime in the morphine, certainly not to calcium hydroxide. The amount actually present is insignificant.

On comparing the method of the Pharmacopœia with that of Teschemacher and Smith, it will be found that each has its advantages and disadvantages; and no doubt each process is capable of improvement. The official method has the advantage of greater expedition. It has been objected that the system of taking aliquot parts is fallacious, but I think the objection has little foundation in fact. If all the soluble constituents pass into solution, and a certain proportion of the total solution is used for the analysis, how can there be any error? Everyone would admit that in course of time the soluble matters must be completely dissolved and become equally diffused through the liquid. If then it is shown (as has been done by Mr. Conroy) that there is no greater yield of morphine when the opium is triturated and digested for some hours than when it receives half an hour's treatment, the proof seems pretty conclusive that error in the Pharmacopœia process does not arise from using a given proportion of the solution.

The employment of lime in assaying opium has been condemned by Teschemacher and Smith, and also by Rowland Williams,* yet it has much to be said in its favour. It gives a purer solution of morphine than can be obtained by any other single operation, and besides eliminates nearly all possible adulterants. The morphine precipitated from the solution by ammonium chloride is usually remarkably pure, we might say *always* if the opium is genuine. Samples are, however, occasionally met with which yield with the chloride of ammonium a certain amount of flocculent precipitate along with the morphine. In such cases it is pre-eminently necessary to apply the titration with standard acid. Should there be any suspicion of the presence of calcium carbonate, it is better to test a portion of the precipitate therefor, and if present, dissolve in alcohol, filter, and after evaporation, titrate the residue. There can be no doubt that the editors of the Pharmacopœia ought to have allowed for the inevitable loss of morphine in the mother waters, especially when any other trustworthy method is permitted.

It would be easy to start various theoretical objections to the method followed by Messrs. Teschemacher and Smith, but as these chemists hint, there is nothing to be gained by so doing if the process yields good results in practice; and *that* it seems to do. The method is fully described in their paper, but it may be given briefly as follows: Take 200 grains of opium, exhaust with water, and evaporate to a thin syrup. Now transfer to a flask, using as little water as possible. Add 50 fluid grains of alcohol and 600 fluid grains of ether. Mix and then add 50 fluid grains of ammonia (sp. gr. ·935). Shake occasionally during the next eighteen hours, filter, and wash the precipitate first with "morphiated spirit" and then with "morphiated

* *Pharm. Journ.*, [3], xv., 475.

* *Chemical News*, vol. lvii., 134.

water." Now dry the precipitate, powder it, and digest with benzene. Collect the morphine on a filter, wash with benzene, dry, and weigh. Finally, titrate with standard acid, using litmus as an indicator.

It will be noticed that there is little, if anything, in this method that can be called *new*. All the individual operations have been in use for years back. Still, it may well be doubted whether any published process gives as good results. Most of these processes are vitiated by one cause or another; frequently from the employment of too much alcohol, and sometimes from the weighing as morphine of things other than morphine. One might be inclined to carp at the instruction of Messrs. Teschemacher and Smith "to evaporate to a thin syrup" before adding the alcohol. In the case of a poor opium with a small amount of extractive matter, the proportion of alcohol to solution would be increased as compared with an average sample. It would seem more accurate to state that the opium solution should have a certain volume before the addition of the alcohol. There is one possible source of error which the Teschemacher process does not guard against. Ammonia precipitates several inorganic bases, which might thus conceivably be reckoned as morphine. These bases would be eliminated by the lime used in the Pharmacopœia process. This may be regarded as somewhat of a theoretical objection, but it would be as well to make sure that there was no inorganic base present. There is an obviously weak point in the official process from a manufacturer's point of view, a weakness from which the process under discussion is free. We refer to the fact that if the opium contains only 1 per cent. of morphine, the official process returns it as containing none. Yet this is no real disadvantage to the method as a Pharmacopœial process, because an opium containing only 1 per cent. of morphine is pharmaceutically worthless. Indeed, it may well be doubted whether the present official process for assaying opium is not the best of any of the known methods, considering the matter from a pharmaceutical standpoint, although it would certainly be better to add some test such as titration with standard acid in order to ascertain the degree of purity of the morphine precipitate.

There is one source of error in the Pharmacopœial and in all the other processes for assaying opium, in which the morphine is weighed, not titrated. As I showed in a former paper,* morphine hydrate loses weight very slowly in a water-bath, so slowly indeed that two weighings made at an interval of twenty minutes may appear identical, and yet the substance is then neither morphine hydrate nor anhydrous morphine, but a mixture of the two. The more accurate plan is to dry in an air-bath at 110° C., and weigh as anhydrous morphine. This method, however, is contrary to usage, and would necessitate weighing in clasped watch-glasses, instead of the ordinary plan of counterpoised filters. For ordinary practical work it is doubtless sufficient to dry at a temperature not exceeding 60° C., and to consider the substance dry as soon as two weighings at an interval of a quarter of an hour coincide. Of course, if the morphine is estimated with standard acid, the state of hydration in which it exists is of no consequence.

* *Pharm. Journ.*, [3], xviii., 701.

SELECTIONS FROM THE NATIONAL FORMULARY

Issued under the auspices of the American Pharmaceutical Association.

(*Continued from page* 70.)

Elixir Glycyrrhizæ Aromaticum.

Aromatic Elixir of Glycyrrhiza. Aromatic Elixir of Liquorice.

Fluid Extract of Glycyrrhiza	2 fluid ounces
Oil of Cloves	6 minims.
Oil of Cinnamon (Ceylon)	6 „
Oil of Nutmeg	4 „
Oil of Fennel	12 „
Purified Talcum	360 grains.
Aromatic Elixir	enough to make 16 fluid ounces.

Triturate the Oils with the Purified Talcum and the Fluid Extract, then add *fourteen* (14) *fluid ounces* of Aromatic Elixir, filter, and pass enough Aromatic Elixir through the filter to make *sixteen* (16) *fluid ounces*.

Elixir Picis Compositum.

Compound Elixir of Tar.

Syrup of Wild Cherry	3 fluid ounces.
Syrup of Tolu	3 „
Sulphate of Morphine	2½ grains.
Methylic Alcohol	360 minims.
Water	a sufficient quantity.
Wine of Tar	enough to make 16 fluid ounces.

Dissolve the Sulphate of Morphine in about *one* (1) *fluid drachm* of hot Water, and add the solution to the two syrups previously mixed. Then add the Methylic Alcohol and enough Wine of Tar to make *sixteen* (16) *fluid ounces*.

Each fluid drachm contains about $\frac{1}{50}$ *grain of Sulphate of Morphine.*

Note.—Much of the commercial "Wood Spirit" or "Wood Naphtha" is unfit for medicinal purposes. Refined Wood Naphtha or Methylic Alcohol should be colourless and freely miscible to a clear liquid with water, alcohol and ether. Its odour, which is characteristic, should be free from empyreuma. It should contain at least 90 per cent. of absolute Methylic Alcohol, which corresponds to a specific gravity of 0·846 at 15° C. (59° F.). On mixing methylic alcohol cautiously with one-fourth its volume of sulphuric acid, the liquid should remain colourless or acquire not more than a very pale yellowish-red tint; and on gently heating methylic alcohol with an equal volume of a 10 per cent. solution of potassa, the mixture should not acquire a brown colour.

Elixir Rhamni Purshianæ.

Elixir of Rhamnus Purshiana. Elixir of Cascara Sagrada.

Fluid Extract of Rhamnus Purshiana	4 fluid ounces.
Elixir of Glycyrrhiza	4 „
Compound Elixir of Taraxacum	8 „

Mix them. Allow the mixture to stand a few days, if convenient, and filter.

Each fluid drachm represents 15 *grains of Rhamnus Purshiana.*

Elixir Rubi Compositum.

Compound Elixir of Blackberry.

Blackberry Root	2 troy ounces.
Galls	2 „ „
Cinnamon, Saigon	2 „ „
Cloves	½ troy ounce.
Mace	¼ „ „
Ginger	¼ „ „
Diluted Alcohol	a sufficient quantity.

Blackberry Juice, recently expressed . . . . . 3 pints.
Syrup . . . . . 3 pints.

Reduce the solids to a moderately coarse (No. 40) powder, moisten it with Diluted Alcohol, and percolate it with this menstruum in the usual manner, until *two* (2) *pints* of percolate are obtained. To this add the Blackberry Juice and Syrup, and mix thoroughly.

Elixir Sodii Bromidi.

Elixir of Bromide of Sodium.

Bromide of Sodium . . . 1280 grains.
Citric Acid . . . . . 30 „
Adjuvant Elixir . enough to make 16 fluid ounces.

Dissolve the Bromide of Sodium and the Citric Acid in about *twelve* (12) *fluid ounces* of Adjuvant Elixir by agitation. Then add enough Adjuvant Elixir to make *sixteen* (16) *fluid ounces*, and filter, if necessary.

Each fluid drachm contains 10 *grains of Bromide of Sodium.*

Elixir Sodii Hypophosphitis.

Elixir of Hypophosphite of Sodium.

Hypophosphite of Sodium . 256 grains.
Citric Acid . . . . . 30 „
Aromatic Elixir enough to make 16 fluid ounces.

Dissolve the Hypophosphite of Sodium and the Citric Acid in about *twelve* (12) *fluid ounces* of Aromatic Elixir, by agitation. Then add enough Aromatic Elixir to make *sixteen* (16) *fluid ounces*, and filter, if necessary.

Each fluid drachm contains 2 *grains of Hypophosphite of Sodium.*

Elixir Taraxaci Compositum.

Compound Elixir of Taraxacum.

Taraxacum . . . . . 1 troy ounce.
Wild Cherry. . . . . 1 „ „
Sweet Orange Peel, recently dried . . . . . 1 „ „
Glycyrrhiza, Russian, peeled 3 troy ounces.
Cinnamon, Saigon. . . . 120 grains.
Cardamom . . . . . 120 „
Canada Snake Root . . . 120 „
Caraway . , ... 120 „
Cloves. . . . . 40 „
Alcohol,
Water, each . . . . . a sufficient quantity.
Syrup . . . . . 32 fluid ounces.

Reduce the solid substances to a moderately coarse (No. 40) powder, and percolate, in the usual manner, with a mixture of *one* (1) *volume* of Alcohol and *two* (2) *volumes* of Water, until *sixteen* (16) *fluid ounces* of percolate are obtained. Lastly, add the Syrup, let the mixture stand a few days, if possible, and filter.

Note.—If a precipitate should make its appearance in this preparation on standing it ought to be removed by filtration. This Elixir is chiefly intended as a vehicle or corrigent, to cover the bitter taste of quinine and similar substances.

Emulsio Olei Morrhuæ cum Calcii et Sodii Phosphatibus.

Emulsion of Cod-Liver Oil with Phosphates of Calcium and Sodium. Emulsion of Cod-Liver Oil with Phosphates of Lime and Soda.

Cod-Liver Oil . . . . . 8 fluid ounces.
Mucilage of Irish Moss (N.F.) . . . . . 5 „ „
Phosphate of Calcium . . 128 grains.
Phosphate of Sodium . . 128 „
Syrup of Tolu . . . . . 1 fluid ounce.
Alcohol . . , ... 1 „ „
Flavouring . . . . . a sufficient quantity.
Water . . . enough to make 16 fluid ounces.

Dissolve the Phosphate of Sodium in the Mucilage of Irish Moss, and emulsify the Cod-Liver Oil, with the latter, as directed under *Emulsio Olei Morrhuæ*. Then triturate the Phosphate of Calcium with the Syrup of Tolu, add the mixture to the emulsion, afterwards add the Alcohol and Flavouring, and finally enough Water to make *sixteen* (16) *fluid ounces*. Mix the whole thoroughly together.

Note.—If another method of emulsifying the oil is adopted, the Phosphate of Sodium should be dissolved in the aqueous portion of the mixture, and the Phosphate of Calcium incorporated mechanically.

Emulsio Olei Morrhuæ cum Hypophosphite.

Emulsion of Cod-Liver Oil with Hypophosphite.

Cod-Liver Oil . . . . . 8 fluid ounces.
Mucilage of Irish Moss (N.F.) . . . . . 5 „ „
Any Soluble Hypophosphite 128 grains.
Syrup of Tolu . . . . . 1 fluid ounce.
Alcohol . . . . . 1 „ „
Flavouring . . . . . a sufficient quantity.
Water . . . enough to make 16 fluid ounces.

Dissolve the Hypophosphite in the Mucilage of Irish Moss, and emulsify the Cod-Liver Oil with the latter as directed under *Emulsio Olei Morrhuæ*. Then add the Syrup of Tolu, Alcohol, and Flavouring, and finally, enough Water to make *sixteen* (16) *fluid ounces*. Mix the whole thoroughly together.

Note.—If another method of emulsifying the oil is adopted, the Hypophosphite should be dissolved in the aqueous portion of the mixture.

If more than one Hypophosphite is directed in combination with Emulsion of Cod-Liver Oil, and no definite quantities of the salts are prescribed, equal parts of the several Hypophosphites may be taken, amounting altogether to 128 grains, for every pint of emulsion.

(*To be continued.*)

BENTLEY TESTIMONIAL FUND.

Second List of Subscriptions.

	£	s.	d.
Alfred Clay Abraham	1	1	0
Daniel Amos	0	10	0
C. Russell Andrews	0	5	0
John George Atkinson	0	10	6
Edward Louis Barret	0	10	6
Professor P. W. Bedford (*New York*)	1	1	0
John Bingley	1	1	0
F. C. J. Bird	0	10	6
Albert Henry Cooper	0	5	0
F. Hudson Cox	2	2	0
Frederick W. Fletcher	2	2	0
G. B. Francis	5	5	0
J. M. Furness	0	7	6
Harold Granger	0	10	6
Henry Groves	2	2	0
T. Howard Hall	0	10	6
William Hodgkinson	2	2	0
Henry Holland	0	5	0
H. O. Huskisson	1	1	0
John Ingham	0	5	0
Charles E. Johnson	0	10	6
Frank Harwood Lescher	1	1	0
Joseph Sidney Lescher	1	1	0
F. H McCormick	0	5	0
George D. Mackay	1	1	0
J. B. Mackey	1	1	0
Francis Middleton	3	3	0
Thomas Morson	3	3	0
Reginald E. Nicholls	1	1	0
"Old Friend"	2	2	0
William Mortlock Palmer ..	0	5	0
Jonathan Phillips	0	10	6
Robert Potts	0	10	6
Robert John Price	0	5	0
William Ransom	5	5	0
T. Horne Redwood	1	1	0
Edward J. Reeve	2	2	0
J. G. F. Richardson	1	1	0
Robert Richmond	1	1	0
William Prior Robinson	0	10	6
Sells and Son	1	1	0
Thomas Slater, Junr.	1	1	0
Thomas Slator, Junr.	0	5	0
Charles Edward Stuart	0	10	6
John Thomas	0	5	0
William Walker Urwick	1	0	0
John S. Ward	1	1	0
Dr. A. W. Wheatly	1	1	0
Albert Wilson	0	5	0
John Woodland	1	1	0
Francis Yates	1	1	0
Robert Yates	1	1	0

The Pharmaceutical Journal.

SATURDAY, AUGUST 4, 1888.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE SCHOOL OF PHARMACY.

IT will be seen from the report of the Council meeting in this week's Journal that the educational arrangements in connection with the Society still continue to receive the careful attention which has always been devoted to this very important part of the Society's work. Practical experience of the plan of dividing the session into two courses of five months each has shown that it is in various respects unsatisfactory. That plan was adopted some years ago with the object of attempting to compress into a short period the instruction to be given to pharmaceutical students. But a growing sense of the inadvisability of attempting to do too much within such a short space of time as five months led to a recognition of the desirability of modifying those arrangements, and accordingly advantage was taken of the changes lately made in the educational staff to enter upon the consideration of this subject. As an ultimate result of these deliberations the subject was taken in hand by a committee of the Council, and with the approval of the school staff it has been decided to recommend the introduction of such alterations in the courses of instruction that there will be for all practical purposes a reversion to the original system of having a ten months' course, though with the difference that there will be a six months' course devoted to the more elementary portions of the various subjects taught, and also a supplementary four months' course adapted for the requirements of more advanced students. In this way there will be a break in the courses of instruction at April, affording opportunity for passing the Minor examination, and also for those who desire to do so to continue their studies with the view of passing the Major examination.

One of the main reasons which has induced the Committee to offer this recommendation to the Council was the fact that it has been found that many of the students come up to the School with so little training as to render it impossible for them to obtain in five months the instruction that would be requisite for satisfying their requirements or enabling them to do credit to their teachers. On this point the President took occasion to refer to the desirability of greater attention being paid to apprentices by their masters, with the object of directing their studies by recommending elementary works, and encouraging them to make experiments. In this way much good service might be rendered to the young men, and they would be enabled to overcome many of the deficiencies which are now too frequently apparent when they come up for examination. In the matter of dispensing, for instance, it is most remarkable that there is often a great want of practical knowledge, and it has been said in explanation of this fact that it is impossible to teach apprentices dispensing. But as the President pointed out, there can be no difficulty in setting apprentices to make up prescriptions experimentally without any great loss, and as dispensing is one of the most important parts of a pharmacist's work some means of affording a practical insight into the mode of conducting that work ought always to be afforded to an apprentice by his master. It is on account of deficiencies in such matters as could be and ought to be taught during apprenticeship, that it has been found necessary to have recourse to the expedient of establishing courses in practical pharmacy, and thus extending the subjects of study to which the student's attention has to be given within the period of attendance at the school.

As will be seen from the report of the Council proceedings the recommendation of the Committee was very favourably received, and although some of the details of the proposed scheme met with criticism by some members of the Council, that criticism was in no degree adverse to the suggested alterations, but directed rather to advocating a still further amplification of the time allotted to particular subjects. It was in this sense that Mr. MARTIN urged the claims of materia medica, and there can be no question that the arguments he made use of were well founded in the abstract, but there still remains the practical difficulty of not being able to command the attendance of students for a sufficiently long period to admit of time being found to do all that is desirable. Here again, however, is a case in which instruction and study during the period of apprenticeship might do much towards the acquisition of a decent knowledge of the materia medica, and be the means of saving valuable time at a later period. As the result of a very full discussion of the subject the motion for adopting the report of the Committee was carried unanimously, and a circular is now being issued drawing attention to the revised syllabus of the Society's School and explaining the nature of the alterations which have been made as well as the reasons for adopting them. The syllabus itself sets forth in detail the subjects to be dealt with in the several courses of instruction, the times at which the lectures and de-

monstrations will be held, and also gives particulars as to the prizes offered by the Council, and the conditions under which they may be competed for at the conclusion of each course.

TERPENE-FREE ESSENTIAL OILS.

THE extended investigations of essential oils by WALLACH, to which attention has been directed on various occasions in this Journal, appear to have received a practical application which is said to give promise of utility in pharmacy. It has been ascertained that the essential oils are in general mixtures of different substances, which may be referred to two classes, terpenes and stearoptenes, but these individual substances have been regarded as characteristic of the particular oils they were obtained from. WALLACH has, however, shown that the terpenes belonging to a large number of different oils, such as caraway, cajeput, lemon and wormseed, are identically the same substance. He has also succeeded in grouping the terpenes isolated from different oils in classes, the members of which differ in their boiling point and in the characters of their chlorine, bromine and iodine compounds, though they are all of a composition represented by the formula $C_{10}H_{16}$. The boiling points of most of these terpenes lie between 160° and 120° C. It appears from Wallach's investigations that the terpenes, which often constitute a large proportion of the different essential oils, are not, as was formerly supposed, the substances to which the peculiar odours of the different oils belong, but that the odorous character belongs to other constituents which are present in comparatively small proportion. Accordingly it would be preferable for many purposes if the terpenes could be eliminated from essential oils, so as to leave their aromatic constituents for use as flavouring agents. In a recent number of the *Pharmaceutische Centralhalle*, Dr. SCHWEISSINGER reports that this result has been achieved in several cases with such success as to furnish materials that are especially adapted for use in pharmacy and other purposes where a pure and strong flavouring agent is required. He describes these oils as being colourless, of high specific gravity, and of very fine odour. Their strength in regard to flavour is proportionate to the amounts of terpene with which they are associated in the several essential oils, and he designates them as *Olea ætherea sine terpeno*. Specimens of the products from oils of lemon, orange peel and juniper, which he has examined and compared with the ordinary oils, were found to be comparatively very soluble in alcohol and water, and in the case of the product from oil of lemon the strength was thirtyfold that of the ordinary oil. The specific gravity was 0·8981 and the boiling point from 225° to 235°.

The announcement made at the Council meeting that Sir Henry Roscoe would deliver the inaugural address to the students will doubtless be received with great satisfaction, as indicating that the educational work which the Society has so long been engaged in is appreciated by one who has been so active in the promotion of educational progress in this country. We may remind our readers that besides being an eminent chemist and investigator, Sir Henry Roscoe was for many years connected with Owens College, Manchester, as Professor of Chemistry, and that he took an active part in the work of the Royal Commission on technical education of which he was a member. In this capacity, and also as a teacher of science, he has conspicuously distinguished himself, and now as a member of Parliament he is always to be found working in support of the cause of advanced education. The members of the Society may therefore be congratulated that he has kindly consented to take part in the work of the Society by delivering the inaugural address with which the coming session will be opened.

* * *

In the last number of the *Pharmaceutische Zeitung* Dr. Hesse offers some remarks upon Dr. de Vrij's latest announcement to the Pharmaceutical Society of Paris that commercial quinine hydrochloride contains more or less cinchonidine salt. He considers that the numerous erroneous statements and conclusions in the article on this subject in the *Pharmaceutische Weekblad* would justify a lengthy refutation, but since Dr. de Vrij has declared that he is generally unable to sleep well after Dr. Hesse's criticism, the latter restricts himself to dealing with the alleged novelty of the observation. This he entirely disputes, as well as the assumption that the presence of cinchonidine salt is due to the kind of bark now used. He considers it more probable that such has been the case ever since quinine hydrochloride was known, and in any case it was a knowledge of that fact which induced Dr. Hesse ten years ago to extend the application of the quinine test so as to be applicable to quinine hydrochloride. Analyses made by Wolff in 1881 showed that the amount of cinchonidine salt varied from 2·8 to 5·6 per cent., and precisely that make which Dr. de Vrij now extols for purity contained the largest proportion of cinchonidine salt. These results are confirmed by later analyses, which have been made for the purpose of an official report upon the purity of quinine salts, which is now in course of publication.

* * *

As bearing upon the reference made last week to the coming meeting of the German Apotheker-Verein in Berlin, it may be mentioned that the *London Gazette* of Friday last contained an intimation from Her Majesty's Ambassador at Berlin recommending all British subjects intending to visit Germany to provide themselves with passports.

* * *

In consequence of the incessant wet weather having interfered with the carrying out of some of the botanical excursions announced to take place in connection with the Edinburgh Chemists' Assistants and Apprentices' Association, it has been arranged to have a supplementary excursion to Poet's Glen, Currie, on Wednesday, the 8th inst., going by Caledonian train at 6.20 p.m., and returning at 8.30 a.m.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, August 1, 1888.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Allen, Atkins, Baildon, Butt, Cross, Evans, Gostling, Greenish, Hampson, Hills, Martin, Newsholme, Nichol, Richardson, Robbins, Savage and Symes.

The minutes of the previous meeting were read and confirmed.

The PRESIDENT read letters which had been received from Mr. Radley and Mr. Woolley, expressing their thanks for the resolutions passed last month, and their continued interest in the Society.

DIPLOMAS.

The undermentioned, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Beck, John Wilson.
Carter, Benjamin.
Crook, George.
Davis, Henry Baker.
Doble, Henry Tregellas.
Evans, Edgar Michael.
Evans, John.
Heaton, Simon Wood.
Long, Alexander John Temlett.
Lucas, Edward William.
Melvin, George.
Morris, David.
Salter, William Appleton.
Vallance, Arthur Clayton.
Want, William Phillip.
Wilson, John.
Wright, John.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major Examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Beck, John Wilson .....Tebay.
Carter, Benjamin .....Falmouth.
Crook, George .....Southport.
Davies, James John.....Newcastle Emlyn.
Davis, Henry Baker .....London.
Evans, Edgar Michael .....London.
Forster, James Beaty .....Kingmoor.
Heaton, Simon Wood.....Leeds.
Long, Alex. John Temlett.....Bristol.
Melvin, George ....Edinburgh.
Vallance, Arthur Clayton .....Mansfield.
Want, William Phillip .....Lewisham.
Wilson, John .....Edinburgh.
Wright, John .....Macclesfield.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Bostock, John .....Stockton Heath.
Bottomley, William .....Halifax.
Graham, Henry .....London.
Greaves, Robert Bond.....Sheffield.

ASSOCIATES.

The following, having passed the Minor examination, and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Atkinson, Leonard Joseph ...Greenwich.
Baker, Herbert William..... ..London.
Bewers, Frederick John.....Lexden.
Bice, James .....St. Ewe.
Blott, Hugh Russell .....Bristol.
Bromwich, Thomas.....Dudley.
Buchan, David Donaldson.....Stirling.
Carman, Frederick Henry .....Lowestoft.
Cox, Herbert Victor .....Southampton.
Cox, William Francis.....Hipperholme.
Douglas, James Wellesley.....London.
Dring, Henry .....Hingham.
Dyson, Archibald .....London.
Eynon, Charles James .....Leamington.
Fryer, Charles John .....Warwick.
Griffith, William .....London.
Hitchman, Walter .....Kettering.
Horne, Joseph .....Aberdeen.
Hunter, Robert .....Glasgow.
Jones, James .....Liverpool.
Jones, Joshua ....Newcastle Emlyn.
Knaggs, Chas. Marshall Robert. Upleatham.
Lewis, Richard George .....Carmarthen.
Lockwood, Johnson .....York.
McKenzie, James .....Perth.
Mason, Robert..... .....Paisley.
Merson, George .....Fraserburgh.
Moody, William Morton.....Salisbury.
Mossop, Henry.....Whitehaven.
Ogle, John Henry .....London.
Ough, Lewis.....Plymouth.
Parkinson, William Armor ...Preston.
Parry, John .....London.
Pepperdine, Harry .....Peterborough.
Phillips, Wilfred Charles .....Stevenage.
Reid, Charles Stewart .....Aberdeen.
Rowe, Frank.....Ilfracombe.
Smart, Thomas Willis .....Reading.
Smith, Charles Bond .....Potton.
Stuart, William .....Preston.
Sturton, John Gilbert.....Peterborough.
Turnbull, Henry John .....Darlington.
Wilkinson, Thomas..... ..Crook.
Willcock, Frederick Albert ...Wolverhampton.
Willows, Herbert George .....Doncaster.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Anderson, Alfred Laker.....London.
Bate, Walter Humphries .....London.
Belcher, George Clement .....West Bromwich.
Black, James .....Dumfries.
Bush, James Edward.....Dunmow.
Darch, Ernest .....London.
Fletcher, Herbert Parker .....Scunthorpe.
Henderson, Robert .....Carlisle.
Jeremiah, Tom Charles .....Newcastle Emlyn.
Jones, Henry Gladstone.....Aberystwith.
Kinsman, William Ernest .....Devonport.
Mundy, Albert Edward .....London.
Murnaghan, Arthur Walter ...Southampton.
Neal, Arthur Edwin .....Cambridge.
Paternoster, William Chas. T...Cirencester.
Price, Charles Hedley .....Leominster.
Richardson, David Bee .....Edinburgh.
Roberts, Rees R. .....Blaenau Festiniog.
Rose, James Dudfield, Junr. ...Jarrow-on-Tyne.
Rossiter, Robert Tapley .....Paignton.
Rossiter, Samuel .....Paignton.
Shaw, James Edward.....Leeds.
Sowray, Walter .....York.

Tickle, Thomas .....Exbourne.
Ventham, Arthur William.....Portsmouth.
Wilkerson, Albert Henry .....Epsom.
Witney, Frederick Harcourt...Devonport.

Addition to the Register.

The Registrar reported that—
William Thomas Sturges, 30, Shepherd's Bush Green, W. having made a declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been duly supported, his name had been placed on the Register.

The following table was laid on the table by the Secretary, showing the centres and the number of attendances at each:—

Preliminary Examination.

List of Centres and Table of Attendances of Candidates at each Centre.

	1885. Jan., Apr., July, Oct.	1886. Jan. Apr., July, Oct.	1887 Jan., Apr., July, Oct.	1888. Jan.,	1888. Apr.	Total number of attendances at each centre at 14 examinations.
ENGLAND AND WALES.						
Birmingham	62	64	66	15	13	220
Brighton	12	11	20	4	6	53
Bristol	34	55	36	11	6	142
Cambridge.....	8	15	9	3	6	41
Canterbury	17	9	16	2	3	47
Cardiff	34	41	25	2	6	108
Carlisle	27	24	39	14	14	118
Carmarthen	56	46	59	10	13	184
Carnarvon	31	29	22	4	7	93
Cheltenham	7	5	10	4	5	31
Darlington.....	20	22	24	6	8	80
Exeter	33	41	31	6	10	121
Hull	21	19	20	3	8	71
Lancaster	18	17	29	7	3	74
Leeds	71	55	61	10	24	221
Lincoln	20	35	34	11	11	111
Liverpool	58	50	68	14	13	203
London	170	169	148	39	61	587
Manchester	95	85	110	22	29	341
Newcastle.....	35	35	51	5	10	136
Northampton	17	16	13	2	5	53
Norwich.....	25	33	22	2	10	92
Nottingham	46	48	49	10	16	169
Oxford	6	7	15	0	3	31
Peterborough	19	18	22	3	5	67
Sheffield.....	22	26	29	12	7	96
Shrewsbury	17	21	20	6	7	71
Southampton	36	29	29	8	10	112
Truro	15	14	20	3	4	56
Worcester	8	7	11	2	3	31
York	20	25	32	8	10	95
SCOTLAND.						
Aberdeen	45	44	48	14	13	164
Dundee	29	35	25	9	12	110
Edinburgh.....	85	87	83	23	43	321
Glasgow.....	41	52	50	12	23	178
Inverness	13	7	17	1	5	43
Douglas, I. of Man	3	5	3	0	0	11
Guernsey	0	2	5	2	0	9
Jersey.....	2	2	2	0	1	7

Superintendents of Written Examinations.

The following gentlemen were appointed Superintendents and Deputy-Superintendents of written examinations for the ensuing year:—

Superintendents.

Aberdeen .....Strachan, Alexander.
Birmingham ....Southall, Alfred.
Brighton .....Gwatkin, James Ross.
Bristol ....Stroud, John.
Cambridge .....Deck, Arthur.
Canterbury .....Bing, Edwin.
Cardiff .....Munday, John.
Carlisle .....Thompson, Andrew.
Carmarthen .....
Carnarvon .....Lloyd, William.
Cheltenham .....Barron, William.
Darlington .....Robinson, James.
Douglas, Isle of Man ...Brearey, Arthur William.
Dundee .....Hardie, James.
Edinburgh .....Stephenson, John B.
Exeter .....Broom, William Willey.
Glasgow .....Kinninmont, Alexander.
Guernsey .....Collenette, Adolphus.
Hull .....Bell, Charles Bains.
Inverness .....Allan, Alexander.
Jersey .....Ereaut, John.
Lancaster .....Vince, James.
Leeds .....Reynolds, Richard
Lincoln .....Maltby, Joseph.
Liverpool .....Symes, Charles.
London .....Taylor, George Spratt.
Manchester .....Benger, F. Baden.
Newcastle-on-Tyne.....Martin, Nicholas Henry.
Northampton .....Bingley, John.
Norwich .....Sutton, Francis.
Nottingham .....Parker, William Henry.
Oxford .....Prior, George Thomas.
Peterborough .....Heanley, Marshall.
Sheffield .....Ward, William.
Shrewsbury .....Cross, William Gowen.
Southampton .....Dawson, Oliver Robert.
Truro .....Percy, Thomas Bickle.
Worcester .....Virgo, Charles.
York .....Sowray, Joseph.

Deputy-Superintendents.

Aberdeen .....Reid, William.
Birmingham.....Churchill, Walter John.
Brighton .....Savage, William Wallace.
Bristol .....Pitman, John.
Cambridge .....King, George.
Canterbury .....Amos, Daniel.
Cardiff .....Coleman, Alfred.
Carlisle .....Hallaway, John.
Carmarthen .....Davies, R. Morgan, jun.
Carnarvon.....Francis, James.
Cheltenham .....Fletcher, John.
Darlington .....Hutchinson, Rev. E.
Douglas, Isle of Man ...Kneale, L. L.
Dundee .....Hardie, James Miller.
Edinburgh .....Ainslie, William.
Exeter .....Harris, Henry William.
Glasgow .....Davison, Thomas.
Guernsey .....Dupuy, Edgar.
Hull .....Stoakes, Benjamin M.
Inverness .....Ogston, William.
Jersey ....Ereaut, George.
Lancaster .....Arkle, William.
Leeds.....Smeeton, William.
Lincoln .....Battle, John Scoley.
Liverpool .....Parkinson, Richard.
London ..... { Allen, Charles Bowen. / Moon, Harry.
Manchester .....Midgley, Charles.
Newcastle-on-Tyne .....Wright, Alfred.
Northampton .....Mayger, William D.
Norwich .....Corder, Octavius.
Nottingham .....Patchitt, Edwin Cheshire.
Oxford .....Thurland, Henry.
Peterborough .....Saunders, James Edwin.

Sheffield	Newsholme, G. T. W.
Shrewsbury	Blunt, Thomas Porter.
Southampton	Chipperfield, Robert.
Truro	Anstey, John Upham.
Worcester	George, Henry.
York	Wilson, Thomas William.

Mr. EVANS asked if a Superintendent could not be appointed at Aberystwith, as many of the young men in that district had a long distance to travel for these examinations.

The PRESIDENT said the centres were fixed in June last, but the matter might be brought forward next year when the arrangements were being made. It was very often found that young men preferred to go some distance from their homes to be examined.

REPORT OF COMMITTEES.

FINANCE.

The report of this Committee, including a recommendation that certain accounts be paid having been read,

The PRESIDENT moved the adoption of the report. The payments included an instalment of fifty guineas to the Research Committee, being a portion of the grant already ordered; the solicitor's bill; £100 to the architect; and £735 14*s.* 1*d.*, the balance due to the contractor for the new building, particulars of which would be given in the Building Committee's report. On the Benevolent Fund account, £1773 had to be paid in completing the purchase of the ground rents resolved upon at the last meeting.

The motion was carried unanimously.

BENEVOLENT FUND.

The minutes of this Committee included a recommendation of the following grants:—

£5 to the widow (aged 55) of a registered chemist and druggist. Applicant has had three previous grants, and suffers from chronic illness. (Lancs.)

£10 to the widow (aged 52) of an annuitant from 1871 to 1881, who was a registered chemist and druggist. Applicant has had seven previous grants. (Norfolk.)

£10 to the widow (aged 58) of a member from 1853 to 1885. Applicant has had two previous grants and has recently left the hospital after a long illness. (Lincolnshire.)

£10 to the widow (aged 34) of a registered chemist and druggist. Applicant's husband had had three grants, the last in July, 1887, and an application from him was before the Committee last month, but he had died in the meantime. There are four children, only two of whom are old enough to earn anything. (Lancs.)

£10 to the widow (aged 47) of a registered chemist and druggist, who died in May last. There are five children, the eldest aged 14. (Glasgow.)

Two other cases the Committee had declined to entertain.

The VICE-PRESIDENT moved the adoption of the report. All the applications on the present occasion were from widows. He might mention that one of the cases which were not entertained was from the widow of a gentleman who had ceased all connection with pharmacy for a good many years, having joined the medical profession. The applicant had some means of livelihood, and it was felt that if she required any additional assistance she should apply to the medical profession rather than to the Benevolent Fund of the Pharmaceutical Society.

The report and recommendations were unanimously adopted.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
June	Day	677	35	14	26
	Evening	149	13	0	7

	Circulation of books.	Total.	Town.	Country.	Carriage paid.
June		271	140	131	£1 14 9

The undermentioned donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Böning (C.), Untersuchungen des Inversionsproductes der aus Trehalamanna stammenden Trehalose, 1888.

Engelhardt (R. v.), Beiträge zur Toxikologie des Anilin, 1888.

Kordes (R.), Vergleichung des wichtigeren narkotischen Extracte der russischen Pharmacopöe, 1888. From Professor DRAGENDORFF.

Sewill (H.), Dental Caries, 2nd ed., 1888. From the AUTHOR.

Monthly Magazine of Pharmacy, 1886–87.

Chemist's Journal, 1883. From Mr. J. STRICKETT.

Provot (H.), Des antipyrétiques de la série aromatique, 1888. From Professor SOUBEIRAN.

Royal Society of Edinburgh, Proceedings, 1881–87.

— List of Members, 1887. From the SOCIETY.

Royal Society of New South Wales, Journal and Proceedings, vol. 21. From the SOCIETY.

Nieuw Tijdschrift voor de Pharmacie in Nederland, Nov. 1885 to June 1887.

Pharmaceutisch Weekblad, sundry nos. 1879–88. From Dr. J. MOREL.

Radcliffe Library, Oxford, Catalogue of books added during 1887. From the RADCLIFFE TRUSTEES.

National Formulary of Unofficinal Preparations, 1888. From the AMERICAN PHARMACEUTICAL ASSOCIATION.

Illinois Pharmaceutical Association, Proceedings, 1880, 1881, 1883, 1884. From the ASSOCIATION.

Martindale and Westcott, Extra Pharmacopœia, 5th ed., 1888. From Mr. W. MARTINDALE.

University of Glasgow, Calendar, 1888. From the UNIVERSITY.

Philadelphia College of Pharmacy, 68th Annual Announcement, 1888. From the COLLEGE.

Smithsonian Report, 1885, part 2. From the SMITHSONIAN INSTITUTION.

Hill (J.), Flora Britanica, 1760. From Mr. BOTTLE.

The Committee recommended that the undermentioned book be purchased:—

For the Library in London—

Handwörterbuch der Chemie, herausgegeben von A. Ladenburg. 4 vols.

The Committee recommended that the new edition of the Catalogue be placed in the printer's hands, and deferred the question of the number of copies until the October meeting.

The Committee recommended that the Librarian should attend the annual meeting of the Library Association, to be held in Glasgow, on September 4 and following days, and that the usual grant be made for his expenses.

The Committee had ordered that the Libraries and Museums in London and Edinburgh be closed in the evening during August and September; that the Library and Museum in London be closed the first fortnight in September, and that the Library and Museum in Edinburgh be closed from August 20 to September 4, both dates inclusive.

The Committee recommended that the *Pharmaceutical Journal* be sent to the Pharmaceutical Society of Queensland and the Illinois Pharmaceutical Association regularly as published.

Museum.

The Curator's report had been received, and included the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
June	Morning .	656	42	7	24
	Evening .	101	9	1	3

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimen of the rhizome of *Scopolia carniolica* from Moravia. From Mr. F. RANSOM.

Fifty-four specimens of drugs, chiefly from the Southern States of North America.
From the DIRECTOR, Kew Gardens.

Specimen of the twig bark of *Euonymus atropurpureus*. From Messrs. PARKE, DAVIS and Co.

Specimens of the bark of *Gynocardia odorata*, *Schima Wallichii* and *Dichroa febrifuga*.
From Mr. D. HOOPER, Ootacamund.

Fresh specimens of Biennial Henbane.
From Messrs. BATTLEY and WATTS.

Specimen of the dried milky juice of *Ferula fœtidissima*. From Mr. ANDREW FERREIN, Moscow.

Six specimens illustrating the manufacture of lanoline.
From Messrs. BURROUGHS and WELLCOME.

Specimen of the bark, leaves and fruit of *Michelia nilagirica*.
From Messrs. JENKIN and PHILLIPS.

Specimens of dried fungi, including a species used in medicine in the East Indies (*Polyporus sanguineus*). From Mr. H. O. HUSKISSON.

The Staff of the School had attended and reported on their respective classes.

Professor Attfield had handed in a detailed report on the Practical Chemistry class, in which he said that the past session had been particularly satisfactory with regard to the number of students, which was 50 per cent. above the average of the last ten years; with one exception the students had attended regularly, and their conduct had been good.

The Committee had discussed with the Staff some proposed alterations in the school course, and ultimately referred the matter to a sub-committee, consisting of the President, Vice-President, Treasurer and Messrs. Greenish and Hampson for consideration and report.

At a subsequent meeting a report from the above sub-committee had been received and adopted.

Professors Dunstan and Green had reported on the condition of the Society's diagrams and apparatus in their charge.

The School of Pharmacy.

The PRESIDENT moved that the report and recommendations be received and adopted, and that the syllabus, proofs of which had been sent to members of the Council, be approved, with certain verbal alterations. With regard to the ordinary business of the Committee he need only draw attention to the very satisfactory report from Professor Attfield, which showed that the number of entries for the whole session had been much larger than ever before. With regard to the special matter referred to,—the new syllabus,—he might remind the members that some years ago the course of instruction in the school was essentially a ten months' course, but about sixteen or seventeen years ago it was modified and shortened, and an attempt was made to compress into a shorter time the instruction given. For a long time the Council and the Committee had felt that this attempt to give two courses in ten months was not a very satisfactory one. The difficulty in point of time was serious, inasmuch as many of the students wished to go up for examination in June or July, and consequently a large part of th second five months' course was not available to those who wished to present themselves for examination. It was felt that in a school such as the Society's, intended to give the most complete opportunity for acquiring instruction of the highest kind in pharmacy, it was unwise to attempt to do so much in a short space of time, and accordingly when a change was made in the staff of professors it was seriously considered whether some change should not be made also in this respect: but it was postponed for a time. This year the subject had been again taken up by the Committee with the assistance of the school staff, and it had been decided that there should again be practically a ten months' course—though in the wording of the syllabus a six months' course was spoken of—an elementary and an advanced course; but substantially it was a reversion to the old long course, dividing it about April for the convenience of the students, and to give opportunities to those who, having passed the Minor, wished to pursue their studies further with the view of passing the Major examination. It had been borne in upon the Committee year by year that many men presented themselves at the beginning of the session with so little training of any sort that they could not obtain instruction in five months with much satisfaction to themselves or credit to their teachers. If a young man had been apprenticed to a conscientious master, who had directed his attention to certain elementary books and encouraged him to make experiments, he could come up and do a great deal in a short space of time. He personally regretted very much that it had been necessary to establish classes in practical pharmacy and other branches of what might be called technical pharmacy to meet an undoubted want. He wished it were possible for a larger number of those who took apprentices to give them the preliminary technical knowledge which would make every hour in any well-appointed school worth two to an unprepared student. He could only hope that these observations might possibly stimulate more gentlemen who took apprentices to give a little direction to their pupils' studies. He did not and could not expect that, under the varying conditions under which pupils were taken, every one could do the same, because obviously this could not be so, in consequence of the differences in their engagements, education and avocations, but it required very little time on the part of any principal to occasionally direct his pupils in the mode of acquiring a knowledge of practical dispensing. It was remarkable how few men at the end of their apprenticeship knew much about the art of compounding. A large part of that was due to the fact that they had not sufficient elementary knowledge of chemistry, botany, and materia medica, which formed the groundwork or the rationale of every process. It was constantly said that apprentices could not be taught dispensing because there was no dispensing to be done, but he denied that altogether. Every principal could set his apprentices to make up inexpensive prescriptions from his prescription book, without any serious loss to himself and with very great advantage to the pupil, and he thought it was the duty of every one who took apprentices to give them some such opportunities. It was cruel to give them no chance at all. One saw the difficulty which always must exist in getting a situation unless a man was qualified, and therefore it was more than ever important that during the process of pupilage some practical work of the kind should be done. In former days it was the custom for apprentices to become improvers before presenting themselves for examination, and he ventured to think that would be a good thing to do now. It was a great mistake on the part of candidates coming up for examination to rush up as soon as they were twenty-one. Of course, their object was to be able to take any good situation that was offered, and they knew they could not do so without a qualification;

but in many cases where no practical experience had been obtained during apprenticeship, and especially where the apprenticeship had begun early, it would be a great advantage if young men were to obtain further instruction in some shape before coming to that, or any other school, or presenting themselves for examination. This point had been carefully considered by the Committee. There was now a practical pharmacy class besides the teaching in the laboratory, so that as far as possible facilities were provided for acquiring knowledge all round; but he hoped the provision of those facilities would not lead principals to assume that their duties were at an end, or that young men were to come to that School and be put into a mill in October, and be turned out able chemists and druggists in April or July. Such an idea would be most unfortunate and quite contrary to the spirit of those who had directed the Pharmaceutical Society from the beginning. They wanted more than ever to impress upon principals and pupils that during the period of apprenticeship the latter should acquire by reading and study as much technical knowledge as possible, and it was not necessary for that purpose to be in a large town where prescriptions were being constantly prepared. A great deal of knowledge could be acquired in a small town, or even village, if there was the desire on the part of the pupil and a little sympathy on the part of the principal. The syllabus explained itself. No doubt there might be some criticism passed upon it. It had been drawn up with the assistance and concurrence of the teachers, and the sub-committee had felt that a certain amount of deference must be paid to them in the matter. Some who had practical experience in teaching materia medica, and he referred particularly to Mr. Martin, might think that the particular way in which that subject was presented was not quite adequate, but the fact was, it was exceedingly difficult for those who were not teachers to fully appreciate the effect of a syllabus. But he believed that Mr. Martin, who had conducted, and still continued to conduct, classes in that subject in the North of England Society, thought materia medica was not dealt with quite so liberally and systematically as it should be. That gentleman had criticised former courses of instruction so wisely that no doubt his criticism with regard to this particular subject would be very useful, but he would remind him and others who might complain that some subjects were not dealt with so fully as others, that since they had taken to teaching practical pharmacy the entire time available for the students was thereby reduced, and the great difficulty which the Committee had was to find a sufficient number of hours in the week in which to do the work required. In early days when Dr. Pereira charmed everybody by his discourses in that house, those who came to them came with a previous training, and often with an elementary knowledge of botany, and were the flower of pharmaceutical pupils, and those lectures dealt with chemistry, botany, and materia medica. Now, there were three professors who took up a very large portion of the time, and consequently there was a difficulty in dealing liberally in point of time with all the subjects. After a year's experience the staff would be able to amend or modify the scheme if necessary in such a way as to meet the wishes and requirements of the students.

Mr. HAMPSON seconded the motion. He said there was very little which need be said after the exhaustive statement by the President. He heartily approved of the change recommended, which was a return to the good old path, and gave proper time and facilities for better teaching. He was thoroughly persuaded that the school was now in a very excellent condition, and that the Council might be really satisfied with the educational arrangements. That was his feeling at the present time, but there was a time when he had not those feelings. It was impossible to increase the number of hours in the day, and, of course, a good deal had to be got through in the time at disposal, but that was the same with teaching of all kinds, and at any rate he hoped the members of the trade receiving this syllabus would give it their attention and receive it with the authority of the Society. He was quite sure that if it was thoroughly appreciated throughout the country there would be a large influx of students, and he felt that he might invite them on behalf of the Council, with the belief that everything required for the proper training would now be given.

Mr. MARTIN said it was with considerable diffidence that he ventured to offer some comments on that portion of the report which dealt with the prospectus of the School of Pharmacy; but as the President had referred to his criticisms on the former prospectus he might say at once that he had much pleasure in bearing unqualified testimony to the immense improvement which was now manifest. So far as the three important subjects of chemistry, botany, and pharmacy were concerned, they were set forth in a manner worthy of the best traditions of the school, and he hoped, as Mr. Hampson had said, that a large influx of students would be the result. The President had left very little for anyone else to say, but he had rather anticipated that there was one subject on which he (Mr. Martin) might touch in an adverse spirit. It was not at all in that spirit, however, that he desired to speak. When he received the syllabus he read it carefully, bearing as it did so much evidence of thoughtful care on the part of the Committee, to which great thanks were due for its labours, and when he came to materia medica he was greatly pleased to see that in that subject also there was a great improvement, viz., the introduction of the use of the microscope in the practical study of drugs, especially powdered drugs. But he was sorry to say that he could not give his unqualified approval to the method in which this subject was proposed to be taught, owing mainly to the fact that a sufficient amount of time was not allotted to it. He yielded to no one in his respect for the other subjects, chemistry and botany, but he did think that in the course of the week more time should have been found for materia medica, which was to the pharmacist, in the daily pursuit of his calling, of at least as much importance as either of the other two. Neither Mr. Holmes nor any other man could teach materia medica in one hour on twenty-five mornings. He had no doubt that this method had been adopted simply in consequence of the exigencies of the situation, but he thought arrangements might be made to give more time to it. It might be said that other lecturers, the professors of botany and chemistry, dealt with materia medica to some extent, and no doubt to a certain extent that was true, but he doubted if Professor Green ever taught any materia medica as such. He might take as a specimen of a root or a leaf something which would have also to be dealt with in the materia medica class, but he would tell the students nothing whatever about its natural history, where it came from, or its physical or therapeutical qualities. He was not a member of the Committee, and the subject had evidently been so thoroughly considered that he felt great diffidence in offering any suggestion, but in studying the time table, and thinking how it could be arranged, it occurred to him that by commencing at 9 o'clock on Thursday morning instead of at 10, and giving another hour on Friday from 10 to 11, following the lecture on botany, the two subjects being so closely allied, the requisite amount of time could be given without detriment to any other subject. He did not know whether this had been suggested, or what the difficulty was, but this subject was of such vast importance, and he felt so strongly about it, that he thought it should not have been shelved in this manner.

They were, as a Society, greatly interested in this matter; they were the inheritors and custodians of a vast literature on the subject, and they were the only people who really taught it in its entirety. Medical students were taught a certain amount of materia medica, mainly from the therapeutical side, and they devoted much more time to it. In most medical schools he believed 48 lectures were given to it, and if that were so, surely pharmacists who had to practise it every day of their lives, and whose knowledge of it should be exhaustive, ought to give more than 25 hours to it. He should be glad if even at the eleventh hour some better arrangement could be made, and more regard paid to the intrinsic importance of the subject and to the teaching of it in a manner worthy of the traditions of the School. He cast no slur whatever on Mr. Holmes, who he had no doubt would convey as much information in 25 hours as many men would in 50, but the thing was impossible, and if it was too late now, he should have to bring the matter forward again on some future occasion.

Mr. SYMES said he was very pleased to find that the Committee had returned to the long session, though he thought it was wise to retain the division, because there were many who would still perhaps come to pass the Minor, and would not be wise enough to go on to the Major. They were really driven by competition into dividing the session some years ago, as it was found a number of schools had been instituted where men were passed through a lot of work in a very short time, and the result was that young men who wanted merely to get through the examinations were sent to those schools, and they had to shorten the period and so got into the two-course system, and it was scarcely opportune until now perhaps to revert to the old condition of things. What encouraged him to believe that it would be successful now was the fact that such a large number of students were entering for the full session. That was most encouraging, and looked as if young men were coming to see the advantage of thorough education instead of cramming. With regard to the materia medica he had already asked Mr. Holmes how he could manage to teach it in the time, and Mr. Holmes had admitted that it was very difficult, and that he would be glad to have two hours a week. The President had not stated why this could not be arranged, or why under the present arrangements the teaching could not begin at nine in the morning. He thought it was a little matter more connected with Mr. Holmes than the Council, but in reply to his question he thought Mr. Holmes did suggest some means of obtaining another hour, and certainly he thought that some of the lectures might be shifted so as to get in another hour and enable Mr. Holmes to do the work in a manner thoroughly satisfactory to himself. He cordially agreed with what the President had said about students working up as far as they could before coming to the school, and he thought if a method he had suggested of requiring apprentices to dispense blank prescriptions were followed it would do a great deal of good. If some amount of pains were spent over a dozen prescriptions taken from the pharmacy prescription book, it would be worth months of ordinary dispensing.

Mr. EVANS said he thought Mr. Holmes's report on the materia medica class showed that the teaching had been conducted in a satisfactory manner. It must be remembered that this was a subject which the students themselves would be able to take up at home, and did not require so much teaching upon as they did in chemistry, botany, and other subjects. The real answer to the complaint which had been made was that the students did pass in this particular branch without further time being devoted to it. Still he thought a little more explanation might be given why they could not have the hour from 9 to 10 instead of 10 to 11, and whether the convenience of all the students was made subservient to that of one man. If so, he thought the question ought to be reconsidered. He thought it would be possible to institute some test as to the students' requirements before they were admitted to the lectures, which would get over the difficulty which had been alluded to of their coming up quite raw and unprepared.

Mr. ATKINS heartily supported the suggestion of the President, that as much work as possible should be done during apprenticeship, and that the course of instruction should go on during the whole term, so that the student might come up prepared, because a student coming up prepared would be better able to appreciate and appropriate the educational advantages offered to him in the School. He thought the suggestion with regard to dispensing was particularly happy. He knew the argument against taking apprentices in remoter places was that they had no dispensing, and hence they must be under a great disadvantage. There was a certain amount of originality in the President's suggestion, and he hoped it would be adopted. Wherever the principal himself was competent, and no man ought to take apprentices who was not, the compounding of prescriptions ought to go on. He was glad to find that Mr. Hampson had now faith in the prospects of the School. In early days he had had occasion to cross swords with him on that point, when there was something like a shadow resting upon the School, but he always said then—do not destroy the School, but improve it if necessary, and make it a model typical School of Pharmacy. He believed that the new regulations would go a long way to accomplish that, and no doubt it would achieve the success it deserved. He quite appreciated Mr. Martin's difficulty. That gentleman had the advantage of coming to the subject with a keen love of it, and naturally every man thought his own special subject was the one of all others which ought to be attended to; but Mr. Martin would discover by and by that it was a question of compromise with regard to time. Whether the particular point which he had referred to could be dealt with he must leave to the Committee.

Mr. HAMPSON said Mr. Atkins and himself might have crossed swords in former days, though he did not think they did any injury to each other; but he feared his present speech would rather have the effect of leaving a wrong impression on those who might read it. He never thought lightly of the work of education in that place; but the position the Council took some years ago was that the Society was scarcely in a position to give that kind of education which was essential, and he was rather desirous that the educational arrangements should be discontinued by the Society and be transferred to some other institution where students could have perhaps greater supervision. He had never underrated its importance.

Mr. HILLS said it was hardly necessary to add anything in support of the motion, with which he heartily sympathised, but there was one point with which the President had not dealt so fully as he should have liked him to, and that was that by the proposed arrangements special facilities were given for an advanced course of instruction for those who proposed passing the Major examination. If there was one point in a student's career when he should be specially encouraged to go on with his studies it was after he had passed the Minor. A larger proportion of Pharmaceutical Chemists were wanted, but there was a great tendency to be content with the Minor qualification, and it should be impressed as much as possible on all parents and others interested in the career of aspirants to pharmacy that the latter should be encouraged to come to the School at the commencement of the session, and to take the

course from the commencement. Thereby they would reap much greater benefit than if they came up at any other portion of the term.

Mr. RICHARDSON said this was one of the most interesting discussions which had taken place for a long time. He was specially pleased that reference had been made to persons in the country who took apprentices, for one of the great blots on pharmacy in times past, and which caused the unpreparedness of youths who came up to the Square was that the principals were too careless with regard to carrying out their duties to their apprentices. He was much in favour of the extension of provincial schools. Some years ago it was said that they had been failures, and speaking of one he was interested in at Leicester that was pronounced to be a failure, and to have almost broken down; but a few of the principals had resuscitated the Association, and he was happy to say that it was now in as flourishing a condition he believed as any school in the country. Last week a botanical garden was inaugurated, which he believed would be an immense advantage in encouraging the study of botany. The association had excellent teachers and was making good progress. This was a matter of great importance, and he thought in all large towns principals should lend all the assistance they could to the local associations; he hoped both they and the assistants would take the matter to heart. He rejoiced that the term of study had been extended to the old period of ten months, as was the case when he was a student. It was generally considered then that the students came up five months for the Minor, and five months for the Major, if they desired to pass it; but he had no doubt that when the immense rush came on, the passing of the Act making the examination compulsory, it was almost inevitable to introduce the arrangement for dividing the session, which was now to be discontinued.

The Council went into committee for a short time to discuss the regulations affecting the Council prizes.

On resuming,

The PRESIDENT said he sympathized with Mr. Martin, and probably the observations Mr. Martin had made would bring about the object he had in view. He did not want to go too much into detail on the subject, and it was not always possible to bring before the public all the details which came before a Committee. What was a good reason in one case might not be a good reason in another, but he might say that although a comparatively short time was apportioned to materia medica, the teacher held a revision class in addition, and he did not debar himself from giving more time than was allotted. During the last session Mr. Holmes had given a great deal more time than appeared on the syllabus, but it had not always been fixed definitely, the revision class not always being held at the same time. Practically those interested in materia medica did get an extra hour. One of the objects of the teacher was not only to teach his subject in a lecture or demonstration, but he also directed the course of a pupil's study, and, where time prevented certain points being touched upon in the lecture, it was easy to direct the reading of the student to them. The revision class being held afterwards, those who had done a little reading by themselves with the assistance of specimens were examined upon it, and in this way very good results were obtained. He quite agreed with Mr. Hills, that it was all important to provide facilities for acquiring advanced knowledge. Where a school was carried on simply from a commercial point of view it must be worked on a commercial basis, but bodies like that Society, which existed primarily for the dissemination of knowledge and only secondarily for the purpose of passing examinations, were bound, whatever they did, to provide facilities for those who went up to pass the Major examination. Every bit of knowledge they could get men to assimilate after passing the Minor was a great gain to them, and would eventually be a great gain to the Society. Those members who had for so many years supported the Society in providing education in its widest sense, and in expending money on education in that building, looked upon this as a *sine quâ non*. He had often said before that the success of the Pharmaceutical Society was assured in proportion as a large number of men in their calling possessed more knowledge than the minimum required to pass an examination. The Society's standard was not the minimum, but an ideal much higher. Everyone who passed the Major was to that extent on the right road, and everyone who, having passed the Major, went further and studied analysis, and practiced it whilst remaining a pharmaceutical chemist, not only did credit to the Society, but produced the effect amongst the public and professional men that they were something more than mere traders. With regard to local schools and associations, it was extremely difficult, in the absence of a compulsory curriculum, for many of these bodies to do what they would wish with regard to education. As far as he had observed, local associations and schools had very often suffered from the apathy of a certain proportion of the townsmen, and as long as it remained optional to an apprentice where he would get his knowledge, and he was not enthusiastic enough to feel that he ought to join the ranks of those who were being educated in his own town, he was very strongly disposed to put off the question of education until his apprenticeship was over. That had for many years been the bane of the arrangements antecedent to the Minor examinations. Those who had been in the chair at the examinations knew full well that that was the great bugbear. When a man failed, in nine cases out of ten he had not done any work of a systematic kind until after his apprenticeship. It was very difficult for local associations to work against this state of laziness, partly produced by want of knowledge on the part of the student, and partly by the want of a little wholesome pressure on the part of the principal. He did not wish to keep the apprentice in a small country town continuously at work, for he had always maintained that in pharmacy, as in other walks of life, a young man might do plenty of work, and yet get plenty of exercise and enjoyment during his apprenticeship; but he must be systematic and apportion his time, devoting a certain part to amusement and exercise and a certain portion to study. A few hours a week devoted to study during four years apprenticeship would amount to a great deal. His desire was to encourage local schools and associations as much as possible. He knew that Mr. Richardson had taken great pains to encourage the new life which was springing up in Leicester, and had shown a very practical interest in it by persuading the Town Council to arrange a botanic garden, which, although it was good for the whole town, was especially good for pharmaceutical pupils. Many other gentlemen present had been in the position of Mr. Richardson, and had done what they could in their respective centres to stimulate local schools. He would advise all young men who were going to the Society's School or to any other to take advantage of all the means of education in their own locality, and if they could not get all they wanted there to go somewhere else to complete it. It was a great mistake, because all that is wanted could not be got in a particular place to abstain from getting any. One of the principal objects in laying down schemes for education was to distribute knowledge and to encourage young men to get through portions of their subjects during apprenticeship. If an apprentice woke up in the third year of his apprenticeship to the fact that he had only one or two years left, and his principal could not allow him time to attend more than one course, let him take that one course during his third year, and

another during the fourth, and then take the remaining subjects elsewhere, if need be, at the end of his apprenticeship. He ought not, because he could not get time for acquiring all the requisite scientific education to pass the examination at one time, to neglect to do as much as he could. He hoped that the interest taken in provincial schools by members of the Society would continue, because they were capable of doing a large amount of very useful work.

The motion for the adoption of the report was then put and carried unanimously.

The Sessional Address.

The President announced that Sir H. Roscoe, M.P., LL.D., F.R.S., had kindly undertaken to deliver the address to the students in October next.

Building Committee.

The report of this Committee stated that the account for the whole of the work done by the contractors had been received, amounting to £9235 14*s.* 1*d.*, of which £8500 had been paid, leaving a balance of £735 14*s.* 1*d.* A summarized statement was appended to it, showing that the cost of the porch was £230; white glazed tiles £350; the extra cost on adjoining premises in Bury Street and Great Russell Street was £240; the fittings of the chemical preparation room, gas fittings, &c., was together £1500. The cost of the building work generally was £6915. There was £165 for extra work done outside the contract. It also recommended that the sum of £100 be paid to the architects.

The President, in moving that the report be received and adopted, said the summarized account just read represented the general cost of the new building. The original contract was for £6300, and as a matter of fact £6900 had been spent. That was largely due to the fact that it had been possible to obtain more space, on which a porch had been built, and this had given a larger staircase and there had been a larger area to cover. It also included a certain amount for improved basement flooring. The expenditure on other buildings arose partly from taking out windows in the basement of adjoining houses and putting up portions of walls which had been disturbed, and part of it was the result of the award of the President of the Institute of British Architects in the arbitration. That and the extra facing bricks represented the sum paid in respect of being able to go up high enough to have a good building. With regard to the fittings, they included some things which might be called furniture, cupboards, shelves, fittings in the examiners' chemical laboratory and in the examination hall, in the preparation room, and in the top floor, also in the balance room, and the two laboratories devoted to research. It did not include what was paid for the fittings to the dispensing room of the examiners, amounting to £300, which was done by Mr. Howlett.

Mr. Butt seconded the motion. He said that, as a member of the Building Committee, he was prepared to take his share of any praise or blame to be attached to these figures. He was not able to be present at the last meeting of the Committee, and therefore had not seen them until lately, but he must say that, seeing the grand total, he was much astonished at the sum which had been expended on adjoining buildings. On the other hand, after carefully looking through the figures, he could not put his finger on a single item which he could say had cost more than it ought to have done, although in the aggregate the amount was so much larger than the contract. In the first place the contract was for £6,300, but that was not for the present building, but for an entirely different building. After the plans had been drawn and tenders sent in and estimates received, the Committee decided to entirely alter the plans, and it was led to understand by the surveyor at the time that these alterations, although very essential, and, as he thought, very beneficial, would entail but a very slight additional cost. The contract being for £6,300, the amount paid to the contractors was £6,900, and out of that sum he believed something like £400 or £500 was an expense forced upon the Committee in consequence of the action taken against them by their neighbours. In order to avoid litigation, it had been decided to alter the plans, and that in the shape of iron girders and certain other alterations entailed an expense of £300 or £400, in addition to which there was a cost of £350 for white glazed bricks, and £240 for alterations to the adjoining houses. These items amounted to about £1000, and were matters which no one could foresee. If the Council had foreseen the result it would have been a question whether it should have gone to law to fight the matter out, or have submitted in the way it had done. Then the cost of the porch was £230, which was entirely outside the contract, because it was never contemplated to get that piece of ground, and considering the porch made a handsome entrance to the building its cost could not be regretted. With regard to the fittings, the sum of £1500 seemed a large sum, but on going carefully through the buildings and seeing the enormous amount of fittings of a technical and expensive character, the gas and water fittings on the various floors, in addition to the laboratories, he did not think the cost had been too excessive. Another item of about £165 was for work in the basement. When the building was contemplated and the plans were drawn no one thought there would be such an excellent basement. There was much more room than was ever contemplated, and it had been utilized in various ways which entailed expense. The surveyors' fees were about on the usual scale, and considering that the surveyor, in consequence of the action of the Council, had to draw a double set of plans, and that there were consultations with regard to the arbitration, and so on, all of which was included, he did not think it could be said that the surveyor's fees were excessive. Then there were certain other things, the arbitrator, the clerk of the works, and night watchman, and so on, which were all necessary, though they were expenses which he never thought would have to be incurred; and it was only when the work began that it was discovered they were necessary. It was absolutely necessary there should be a clerk of the works to see that the contract was carried out properly, and although the expenditure exceeded what was contemplated he did not think any one could say that the money had been expended unnecessarily or in an extravagant way.

Mr. Hampson asked if the expenditure on these new buildings had now ceased, or what amount was still required before it was absolutely complete.

The President said nothing more was required as regarded the building, but there would be some little things in the shape of furniture, a few cupboards, and so on.

Mr. Hampson said he was very glad to hear the Society had apparently come to the end of this matter. He had a distinct recollection of the time when the subject was first brought forward, and a question being raised as to the probable cost of the structure. It was very difficult in the early days to say how much it would cost, but the Council was told roughly it would cost four or five thousand pounds. Now it appeared that the Council had had the same experience as other persons who entered into building operations, and had spent something like double the amount anticipated. He had always anticipated the Society would not get out under £10,000 and it now appeared it was £9235.

Mr. Butt said the total amount was £10,500.

Mr. Hampson said he was laughed at at the time for throwing cold water on so great an undertaking,

but he was not very far out. He could only say he hoped that the future would justify the expenditure; £10,000 was a very large sum to spend, and he was disappointed that it had been found necessary to spend so much, for the money might yet be wanted for future work. He should like a detailed statement with more particulars to be presented, so that members of the Council might have the whole thing well before them, and see exactly what has been expended in different departments—so much for the original contract, so much for fittings, so much for extras, and so much for fees. It would be improving their minds, and might make them a little more cautious in future, because it must not be forgotten that there was another project still to be worked out, and no doubt the members of the Committee had already raised in imagination another structure, beautiful, but somewhat costly, fronting in Bloomsbury Square. Before it was begun he thought it would be well to have a detailed statement of what had already been expended.

Mr. SYMES said he remembered distinctly when this project was first brought forward a question was asked as to how much it would cost, and the Council was told no one could exactly say. That was a very reasonable remark; but still some members wanted to get an approximate amount, and as they were about discussing the whole scheme, including the two houses which would presently fall into their hands, they were told the expenditure would be about £4000 for the back premises and £6000 for the front. When the contract came in it was about £6000 for the back premises, but they were then informed that the building at the back was of a very much more expensive character than need be put up in the front, so that the relative cost of each would be reversed, and that at any rate they would not have to expend more than £6000 on the front premises. If there were any likelihood of exceeding the anticipated amount so much with regard to the front premises, as had been the case with those just completed, it was a very serious matter. The Society had splendid premises, and although he agreed with Mr. Butt that it had good value for all the money expended—and it was a very handsome and elaborate building—he thought a more modest, yet equally useful structure might have been erected. The Committee had been a little elaborate in carrying out the work, but it had been done well, and there was a great deal of decoration which he thought might have been spared if there was any idea that it was going to run to so large a sum. If the same principle were to be carried through with respect to the front premises he was very doubtful if the result would justify so large an expenditure.

Mr. RICHARDSON said he had no hesitation in criticizing this matter, because he was one of those who hesitated very considerably before going in for this huge undertaking, and should have preferred not commencing building the Examination Hall until the Council had the whole scheme before it as one building. He wished to be quite certain whether the total expenditure was £9,235 or £10,500, as stated by Mr. Butt.

The PRESIDENT said the amount before the Council in the report paid to the builders was £9,235. Besides that, there were fees to the architect, fixtures, and extra work outside the contract.

Mr. RICHARDSON said no one had a higher appreciation of the beautiful than himself, but he had always felt sure that the cost of such a magnificent structure would be more than was anticipated. Something had been said about the handsome entrance to the building in Pied Bull Yard, but he must say he was ashamed of the entrance himself, and he hoped the Council would proceed as rapidly as possible with the two front houses when they fell into possession. If it cost £20,000 the Society would have to pay it, but he was in hopes it would not have to erect such an elaborate building as the one now completed, but something more in unison with that in which the Society was now located. It seemed to him that the new building was far too elaborate for the purpose. It also struck him that the dispensing room was rather too small and inadequate for its purpose, and if it were small and cramped now what would it be in the future? It was no doubt necessary to have a clerk of the works where a large building was concerned, but he thought a mistake had been made in employing an architect who wanted to make historical capital at the Society's expense. It was a beautiful building, but too costly for the purpose it was intended for.

Mr. ALLEN, as a member of the Building Committee, wished to ask whether the Council was discussing the history of a success or a failure, for it seemed to him from the tone the discussion had taken as if the Council had done something it was ashamed of. He most fearlessly asserted, as a member of the Committee, that he was not ashamed of anything which had taken place in connection with the new building. It was a splendid addition to the property of the Society, and was one of the most magnificent examination halls in the kingdom; he did not think there was one to compare with it. He was quite at issue with Mr. Richardson as to the accommodation in the dispensing room; there was ample room for the examination of twelve men, with plenty of breathing space, and it was isolated from the general examination room. If there was any deficiency anywhere it was in the chemical laboratory, but he believed that was now thoroughly well adapted to the examinations conducted there. So far as the excess of expenditure went the Council knew very well that the estimate for the original plans was £6300: it was then contended by some members that the Research Laboratory, which was originally designed to be on the ground floor, would be much better placed on the top floor. The Building Committee adopted the suggestion, and a new set of plans was drawn. There was no estimate given for the new plans, because the Committee was told that it had a schedule of prices which was quite sufficient, and that it could go on with the new plans on the schedule, and that the cost would not materially exceed the original estimate. On that assumption the Committee proceeded, and it now found the cost had exceeded the original estimate by £615. But had the work been done on the original plans there would have been a similar bill for extras, so that the real excess was very little over £300. The Council had been cautioned about a scheme it had in the future, and no doubt some scheme would have in due time to be considered, but he failed to see what warning was to be drawn from the execution of these plans. Instead of a chorus of congratulation on the advantages of the new building, there seemed to be a gloomy feeling of regret that the Society had spent so much money and an idea that it had not got the money's worth. He contended that the Society had fully its money's worth, and that it ought to be proud of the result.

Mr. EVANS said if a private individual started building on these principles with a limited capital he would certainly be a candidate for the bankruptcy court, because when the estimated cost of building was £6000, and it actually exceeded £10,000——

The PRESIDENT said it was nothing of the sort. The deliberate and yet feeble manner in which men who were supposed to know something of business dealt with figures was astonishing. Neither Mr. Evans nor any other man ever had an estimate for a building which included estimates for furnishing and fitting. As far as the building was concerned, the estimate was only exceeded by £600.

Mr. EVANS said when he first came on the Council he asked the probable cost of the building, and the President told him it would be limited to £6300.

The PRESIDENT said he told him that was the contract price for the building.

Mr. EVANS: And that there would be some small amount for fittings. No member round the table ever dreamed that the cost of the building, including fixtures, would exceed £10,000. If any one present could say that he did he would ask him to stand up boldly and say so.

The PRESIDENT remarked that Mr. Hampson had already said that he always expected the amount would exceed £10,000.

Mr. EVANS said he knew something about building, and he should like to second Mr. Hampson's suggestion, if it were necessary, that a detailed statement should be supplied to each member, showing also how much the Research Laboratory had cost separately from the rest of the building. He should strongly advise those gentlemen who might be on the Council when the future scheme came forward to be prepared to spend nearly double the amount of the estimate before they had finished.

Mr. GOSTLING, as a member of the Building Committee, was quite prepared to take his share of the responsibility, and said he was exceedingly pleased with the building. When he was Vice-President he had to preside over the examinations in the old room, and he could safely say that there was no comparison between the two. The old room was exceedingly inconvenient; the noise of the dispensing counter was distracting; and the examiners were placed so near each other that they could not do their work as they ought. But in the present room it was a pleasure to go in during the examination: the dispensing arrangements were entirely shut off; there was no noise and no discomfort, and the chemical laboratory, being very near, was very handy and convenient. As to the size of the dispensing room, of course he would have been glad if it could have been larger, but the Committee did the best it could, and the Council was responsible for it, as all the plans were submitted and adopted before the work was done. There was ample room for the examination of twelve candidates at one time in comfort. He was prepared to find that the total cost would be £10,000, for he knew there were always extras in building which could not be calculated, and that also the Council was informed of. The extra £600 on the building alone was very small. He was quite satisfied that the £10,000 could not have been better spent in a better way. It would advance the interests of the Society, especially the Research Laboratory, which would tend to raise the status of the Society if carried on as he hoped it would be, and the Examination Hall was a feature of which the Society might well be proud. As a pharmaceutical chemist living in the country, he was proud to think the Society had such a beautiful building. The Society was not bankrupt; it could pay the cost and have a good balance left, and for what purpose should the money be spent if not for the advancement of pharmacy? He felt sure this building would have that effect. But this was not the time to discuss that; the time had passed when that building was decided on. The Committee had, he believed, exercised the greatest care and discretion, and had given the Society a building which it would be proud of for generations to come.

Mr. ROBBINS was exceedingly gratified to find that the work had given satisfaction to everybody. He knew that paying the bill was not always so agreeable; but he had not heard any one say that the building was not such as could be desired, and there could be no doubt that the Society had value for the money. No one who knew anything about building could have supposed when the work was begun that the £6300 was to pay the whole bill; but the original contract had only been exceeded by about £600, and he had heard no one suggest how any part of that could be saved. More money had been spent than was anticipated, but the Society had got more for it; it had the porch built on ground which now belonged to the Society, and, taking the building as a whole, it had good value for its money, and something which would give the Society a better standing than it had before.

Mr. ATKINS said all the members of Council agreed that they had an admirable building, and he did not even take exception to the dispensing department. The difference between say £7000 and £10,000, without putting any uncharitable construction upon it, might yet afford them a lesson for the future. It practically came to this, that they had spent about £3000, partly on their neighbours and partly on themselves, but he could not see that a single thing could have been avoided; indeed, he believed the Committee had given the most careful attention to every question as it arose all along. But when they had to consider the bigger schemes for the dealing with the houses in Bloomsbury Square, which was always regarded as a more gigantic undertaking than the one in Pied Bull Yard, they must take care not to have the same relative excess over the original estimate if it could be avoided. Of course fittings were costly, and special fittings were exceptionally so, but he did not think anyone anticipated that these and the arrangements with the neighbours would come to so much.

Mr. HAMPSON hoped it would be understood that in any criticisms he had made he in no way wished to blame the Committee who had carried out the work, which he believed had done its duty thoroughly well.

Mr. RICHARDSON said he might say the same. All he intended to convey was that the whole business was too costly for the Society's means.

The PRESIDENT said he must say he felt a little humbled at the discussion, which amounted to snubbing the Committee which had undertaken and carried out the work, when the bill came to be paid. A large part of the discussion had been out of order, but he did not like to stop it. The business immediately before the Council was the bill of the contractors for certain work which had been done, but in a general and discursive way the Council had been dealing with other subjects incidental thereto. He wished the members of Council to remember that the architect was responsible for no more than the cost of the building, £6,915; that the Council had authorized the expenditure of £6,300; and that all the other expenditure involved in the fitments, furnishing, &c., had been brought before the Council, explained, challenged even on the Finance Committee, and agreed to. Mr. Evans would have them believe that the Committee and the members of Council did not know how to carry on their business, and had said more than once that they could have had something done for so much less; but they were not able to get what they wanted for less. It seemed to be considered a very dreadful thing to spend ten, eleven, or twelve thousand pounds in a particular way and they were told they must bear it in mind in future. That was right enough, but what seemed to be lost sight of was that the thing was done on a definite business basis. No one could have put up that building for less money, the fittings were not over costly for the object contemplated, and what little had been expended on decoration was well spent. It would have been a paltry mean thing if it had been otherwise. If the Council would take the same view of the house, which was part of the educational and examination system, as it had of the new syllabus which had just been discussed, that would be the right standard by which to judge it. There were no complaints made by members at the annual meeting when the matter was put fairly before them. What did the Society exist for primarily but to carry out the Acts of Parliament with regard to examinations? and it ought to do

that in a proper way. In the near future it would probably have to divide the examinations and possibly to extend them in various ways, and what was there unreasonable in the Society having a hall which would compare not unfavourably with other buildings of like character owned by other legal examining bodies? He had not received a single complaint from anyone with regard to the expense, and the whole of this want of understanding on the part of one or two members of the Council arose from their own fault. He had said distinctly more than once that he could not tell exactly what the cost would be, and had given reasons why it was impossible to do so. If one member chose to say before he had seen an estimate what he thought the cost would be that it was his business, and those who liked to believe it must take the responsibility; you could not guess at things of that sort. He agreed with the Treasurer that the Society had good value for the money, and the only criticism which could be cast on the building was that if there had been a little less decorations it might have saved perhaps £200 or £300, or say at the outside £500, which was £15 a year, and what was that for a dignified, noble hall through which some thousands of persons would have to pass in the course of their various examinations?

The motion was then put and carried unanimously.

GENERAL PURPOSES.

This report included reports as to the prize examinations, and the motto envelopes had been opened to ascertain the names of the successful candidates.

Practical Chemistry.

Professor Attfield had reported that eighteen students had competed in this examination, the marks obtained by each being appended.

Chemistry.

Professor Dunstan had reported that the attendance of students during the session had been uniformly good, and the behaviour of the students unexceptionable. He had recommended certain changes in the arrangements of the School for next session. He had also reported on the result of the Prize Competitions at the end of the session.

Botany.

Professor Green had reported that only a small number of students had presented themselves for the sessional examination, but all competitors had obtained more than 40 per cent. of the possible marks. For the bronze medal only three students had sent up papers.

Herbarium Prize.

Professor Green had reported favourably on a collection of 328 plants, which had been sent in for this prize.

Materia Medica.

Mr. Holmes had reported on the materia medica examinations very favourably in respect to the papers of those who stood high on the list.

Pharmacy and Practical Pharmacy.

Mr. Ince had reported on the examinations of this class, the paper standing first in the competition for the silver medal being of very great merit.

Council Prizes.

A report on the competition for these prizes had been received from Messrs Dott and Gibson.

Acting on the above reports the Committee recommended that the following Prize awards be made:—

Practical Chemistry.

Silver Medal.....William Appleton Salter.

Bronze Medals .... { Lewis Ough.* / Henry Baker Davis.

* *Mr. Lewis Ough obtained the first place in this competition, but under the regulations is ineligible to receive the Silver Medal.*

Certificates of Honour... { Frank Browne. / Herbert Spargo. / Alfred Mander. / Equal. { Edward William Lucas. / Richd. Tildesley Jennings. / George Munnerley Baxter.

Chemistry and Chemical Physics.

[Five months' course.]

Bronze Medal .....Lewis Ough.

Certificates of Honour .. { James John Davies. / Henry Baker Davis.

[Ten months' course.]

Silver Medal.....William Appleton Salter.

Certificates of Honour .. { Alfred Mander. / Richard Tildesley Jennings. / Frank Browne.

Botany.

[Five months' course.]

Bronze Medal .....Lewis Ough.

Certificate of Honour ..... Henry Baker Davis.

[Ten months' course.]

Silver Medal.....Alfred Mander.

Certificates of Honour... { William Appleton Salter. / Richard Tildesley Jennings. / Edward William Lucas.

Materia Medica.

[Five months' course.]

Bronze Medal .....Lewis Ough.

[Ten months' course.]

Silver Medal..... .....William Appleton Salter.

Pharmacy and Practical Pharmacy.

[Five months' course.]

Bronze Medal .....Lewis Ough.

[Ten months' course.]

Silver Medal.....Alfred Mander.

Herbarium Prize.

Bronze Medal ....Alfred Atkinson.

Council Examination Prizes.

Pereira Medal (*Silver*); *and Books value* £5, *presented by Mr. T. H. Hills.*
William Appleton Salter.

Pharmaceutical Society's Medal (*Silver*); *and books value* £3, *presented by Mr. T. H. Hills.*
Edmund White.

Pharmaceutical Society's Medal (*Bronze*); *and books value* £2, *presented by Mr. T. H. Hills.*
James John Davies.

Solicitor's Report.

The usual letter had been received from the solicitor.

Several cases had been before the Committee in which proceedings were recommended.

The first portion of the report, dealing with the examinations, was considered first and unanimously adopted.

Votes of thanks were passed to Messrs. Dott and Gibson for conducting the examination for the Council Prizes, also to Professor Green for his work in connection with the Herbarium Prize.

The Council went into committee, as usual, to consider the legal portion of the report of the General Purposes Committee.

On resuming the report and recommendations were adopted.

JACOB BELL MEMORIAL SCHOLARSHIPS AND THE REDWOOD SCHOLARSHIP.

The Committee appointed to make the award of the Jacob Bell Memorial and Redwood Scholarships for the

ensuing session, subject to the approval of the Council, reported that twenty-six candidates had presented themselves at the following centres:—Birmingham, 2; Bristol, 3; Cambridge, 1; Carlisle, 1; Edinburgh, 1; Leeds, 1; Liverpool, 1; London, 6; Manchester 2; Nottingham, 2; Oxford, 1; Sheffield, 1; Shrewsbury, 1; Southampton, 1; Truro, 1; and Worcester, 1.

The envelopes bearing the mottoes of the successful candidates had been opened, and found to contain the following names:—

1. Harry Dixon Fuge, Newcastle, Staffs.
2. Richard Henry Norman, Cottenham.
3. William Thomas Jones, Wellington, Salop.

The Committee therefore recommended that the Jacob Bell Memorial Scholarships be awarded to

Harry Dixon Fuge
and
Richard Henry Norman,

and the Redwood Scholarship to

William Thomas Jones.

The report was received and adopted and a vote of thanks was passed to Messrs. Blunt and Tanner for conducting the examination.

The British Pharmaceutical Conference.

The following gentlemen were appointed delegates to the Conference:—The President, Vice-President, Treasurer; and Messrs. Atkins, Butt, Cross, Evans, Gostling, Greenish, Martin, Newsholme, and Symes. The Editor and Sub-Editor of the Journal and the Secretary were also requested to attend.

German Apotheker Verein.

The President reminded the Council that about a week after the close of the Conference there would be a meeting at Berlin of the German Apotheker-Verein, of which Dr. Brunnengräber, one of the honorary members of the Society, was President, and he was requested on his behalf to say that any members of the Society would be very welcome at that meeting. He would also remind any gentlemen who might intend going that it was desirable to be provided with a passport, and that if an old one were used it should be submitted to the German Embassy and properly ratified.

International Pharmaceutical Congress.

Mr. Atkins asked if any delegates were to be appointed to the International Pharmaceutical Congress at Milan. He had called on Mr. Zambaletti about a fortnight ago, and rather gathered from him that the preparations were not in a very forward state.

The President said he referred to this matter at the last meeting, a communication having been received on the subject from Dr. Festina, of Milan, President of the Pharmaceutical Society of Lombardy, to the effect that the Conference would be held about the first week in September. The Secretary had communicated with Dr. Festina, pointing out that it would be desirable if possible to make the meeting a little later, so as not to clash with the British Pharmaceutical Conference, and a reply came that care would be taken so to arrange it. Since then no further information had been received, consequently he supposed that it had not been found possible to make arrangements for holding the Congress this year.

The President moved, in accordance with a resolution of the Board of Examiners of England and Wales, that certificates from L'Ecole Secondaire et Industrielle du Locle, the Ecole Industrielle Cantonale à Lausanne, and the Commission d'Examens de la Confédération Suisse, be received in lieu of the Preliminary examination in the case of Mr. George Sandoz. This gentleman had not only passed a Preliminary examination, but an examination in science of a very high character. His idea was to take back with him to Switzerland an English title so that the numerous English and Scotch travellers in Switzerland might feel confidence not only that he was qualified to practice Swiss pharmacy, but also to dispense English prescriptions. He did not know any way in which the honour and dignity of the Society could be more plainly recognized than by such a proceeding. This gentleman did not apply to be registered without an examination, but simply to be allowed to go up like any other candidate who had passed the Preliminary.

Mr. Symes said he knew a case in which a young German came over here to study English pharmacy with the same object.

The motion was agreed to.

September Council Meeting.

The President said the members of Council would receive, in the ordinary way, notices for a meeting in September, but it was understood that a quorum would not be formed, and therefore the notices should be looked upon as merely formal.

Report of Examinations.

July, 1888.

ENGLAND AND WALES.

	Candidates. Examined.	Passed.	Failed.
Major (10th)	8	6	2
,, (11th)	6	3	3
,, (17th)	7	2	5
,, (18th)	7	4	3
	— 28	—15	— 13
Minor (10th)	24	7	17
,, (11th)	28	8	20
,, (12th)	30	12	18
,, (13th)	31	8	23
,, (17th)	28	18	10
,, (18th)	26	8	18
,, (19th)	29	10	19
	—196	—71	—125
	—	—	—
	224	86	138

SCOTLAND.

	Candidates. Examined.	Passed.	Failed.
Major (17th)	2	2	0
Minor (17th)	11	5	6
,, (18th)	11	7	4
,, (19th)	14	11	3
,, (20th)	13	7	6
	—49	—30	—19
	—	—	—
	51	32	19

Preliminary Examination.

	Candidates. Examined.	Passed.	Failed.
(10th)	391	211	180

(18th) Six certificates were received in lieu of the Society's examination.

EXAMINATION PAPERS.

SCHOOL OF PHARMACY.

Practical Chemistry.

The following are the questions that were set for the competitions in the Class of Practical Chemistry:—

July 26 *and* 27, 1888. *Hours*—10 *a.m. to* 5 *p.m. each day.*

Books and Memoranda permitted.

Standard number of Marks, 100.

FIRST DAY.

1. Examine the accompanying sample of "Iodide of Potassium" for impurities, stating the names of any you may find.

2. Report, shortly, on the purity of the "Calomel" supplied to you.

3. Is there any morphine in "The Powder?"

4. How much hydrate of potassium is present in the "*Liquor Potassæ*?"

SECOND DAY.

5. Analyse "The Solution" submitted to you, stating what basylous and acidulous radicals you find and the probable forms in which they are combined.

6. How much ferrous phosphate is present in the "*Ferri Phosphas*?"

NOTE.—*Manipulation as well as results will be scrutinized.*

Review.

THE EXTRA PHARMACOPŒIA. By WILLIAM MARTINDALE, F.C.S., MEDICAL REFERENCES, by W. WYNN WESTCOTT, M.B. Fifth Edition.*

Little need be said in favour of a work which, published so recently as 1883, has passed into a fifth edition.

Pharmacy, like all things else, is given to change, and there is a restless desire to create and introduce new remedies.

Some of these are trade speculations, and owe their existence to bold advertisement; some are the result of advanced knowledge gained by scientific investigation.

From these and other causes spring up numerous formulæ, which merge into current pharmacy, and with which it is the direct interest and often the duty of the pharmacist to become acquainted.

The 'Extra Pharmacopœia' provides this class of information, and does so with rare discrimination. The list is not swelled by useless nostrums, but such preparations only are included which have a just claim to medical and pharmaceutical recognition.

It is somewhat bewildering to see the long array of preparations which have deservedly attracted attention during the past three years, and the student will rejoice that before he enters upon his business career he is expected to be conversant only with such as have received official sanction.

The authors, by careful deletion and abridgment, have added about 68 pages of new matter, while the book still remains portable and of convenient size.

Probably in a future edition the synopsis of changes effected by the revision (1885) of the British Pharmacopœia may be allowed to disappear as the necessity of the comparison between the new and old will cease.

Amongst recent introductions will be found notices of the group of antipyretics—derivatives of coal tar; not forgetting also saccharin from the same source, which has been the subject of so much discussion.

A group of hypnotics, hyoscine salts, paraldehyde, etc.; the preparations of strophanthus, sparteine and caffeine; some new antisyphilitics, proposed remedies for skin diseases; the new bases for topical application, lanolin and mollin; ophthalmic remedies, as santonate of atropine; and, as might be expected from the previous work of one of the authors, there is a detailed description of the cocaine preparations introduced into the Pharmacopœia of the Royal Ophthalmic Hospital.

The additional formulæ of the Unofficial Formulary of the British Pharmaceutical Conference have been embodied. Mr. Martindale has been materially aided in rendering his manual practically useful by having retained the co-operation of Dr. Westcott, whose medical references are scattered throughout the volume.

It is more than ever desirable that pharmacy and medicine should go hand in hand; neither can afford to stand alone. The intentions of the physician are often frustrated by an imperfect knowledge of the laws of combination, while his range in the selection of remedies is of necessity too limited. It is for the pharmacist to aid him in this direction, to direct his attention to recent discoveries and to point out the best methods of utilizing such information. On the other hand the pharmacist, without the guidance of the physician, is more than apt to produce a whole series of preparations, of doubtful value, and the chief merit of which is the ready sale they may command. It is no small addition to the value of this work that a pharmacist and a physician should have united in presenting a joint record of medical and pharmaceutical progress.

It is impossible for a practitioner in the active exercise of his profession to keep pace with ever-increasing novelties; and quite as hopeless it is for a pharmacist to glean for himself reliable information respecting them from original papers or from periodical literature. This task has been undertaken by the joint authors, who have succeeded in placing before the reader a concise and excellent summary of new or amended formulæ which mark the progress of modern pharmacy.

* London: H. K. Lewis, 1888. 24mo, pp. 462. 7*s.* 6*d.*

BOOK RECEIVED.

THE THERMAL BATHS OF BATH: their History, Literature, Medical and Surgical Uses and Effects, together with the Aix Massage and Natural Vapour Treatment. By HENRY WILLIAM FREEMAN, Surgeon to the Royal United Hospital, Bath. London: Hamilton, Adams and Co., Paternoster Row. Bath: Charles Hallett. 1880.

Obituary.

Notice has been received of the death of the following:—

On the 25th of July, Mr. William Evans, Chemist and Druggist, Chester Street, Mold. Aged 58 years. Mr. Evans had been a member of the Pharmaceutical Society since 1884.

On the 28th of July, Mr. Rowland Gill Jones, Chemist and Druggist, Stourbridge. Aged 61 years. Mr. Jones had been a member of the Pharmaceutical Society since 1869.

On the 29th of July, Mr. William Wale, Chemist and Druggist, Griffydam, Ashby-de-la-Zouch. Aged 73 years.

Correspondence.

THE MINIMUM SIZE OF PILLS.

Sir,—As you have invited the opinion of practical dispensers upon the above subject I should like to add a word or two.

It is always an important point with me to turn out a pill containing as little excipient as possible, and to my mind the smaller the size of the pill, the more elegant is its appearance.

In these days when elegance in pharmacy is becoming more and more advanced, I certainly should support the adoption of a 1-grain minimum size.

It is most desirable that a uniform weight should be observed, and my experience goes to show that the 1-grain size is most usually adopted.

Birmingham. WALTER ASTEN.

Bela.—*Cotyledon Umbilicus.*

J. Foster.—An answer to the question may be found in Watts's 'Dictionary' or any systematic work on organic chemistry.

Medicus.—Reynolds's 'Experimental Chemistry,' published by Longmans.

J. Morrison.—We understand that one of the cases is being already dealt with, but your letter has been handed to the Registrar as you desired.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Alcock, Polack, Allen, Hooper, Clagur, Shilden, Benger.

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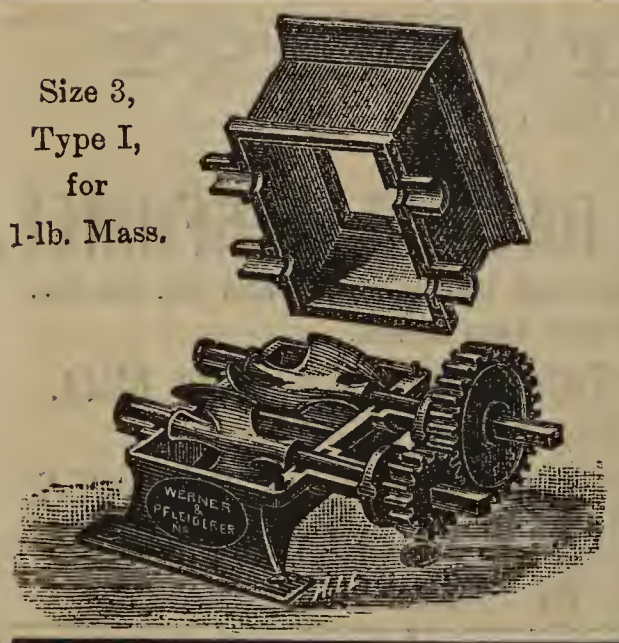

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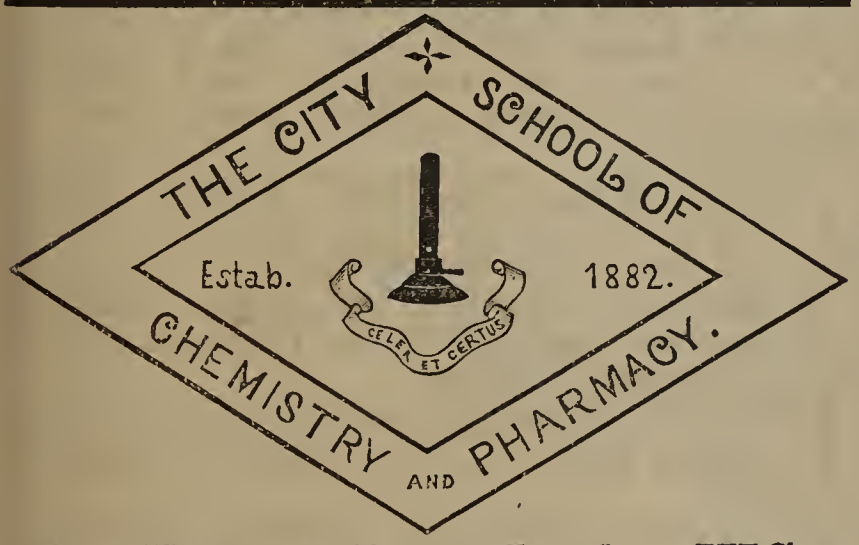

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Dublin Journal of Medical Science, June, 1888.

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Chemist and Druggist, Dec. 3, 1887.

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British and Colonial Druggist, May 26, 1888.

Fletcher, Fletcher & Stevenson,

North London Chemical Works, Holloway, London, N.

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The Pharmaceutical Journal AND Transactions.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

SPECIAL NOTICE.

The Society's Libraries and Museums in London and Edinburgh will not be open in the evening during August and September. The Library and Museum in London will be closed during the first fortnight in September. The Library and Museum in Edinburgh will be closed from August 20th to September 4th, both dates inclusive.

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The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

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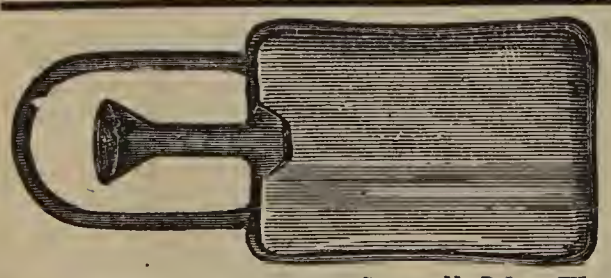

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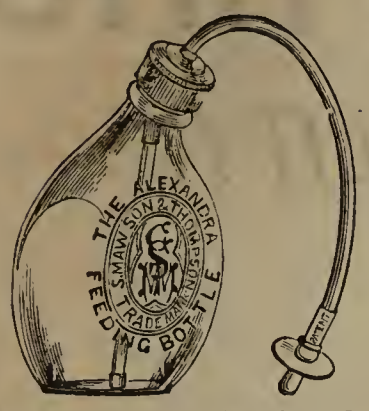

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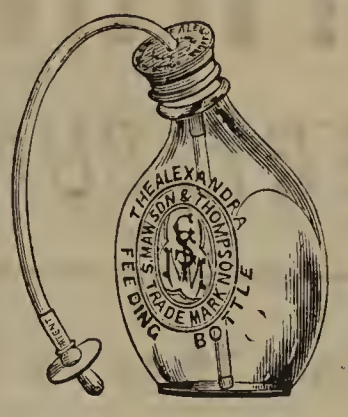

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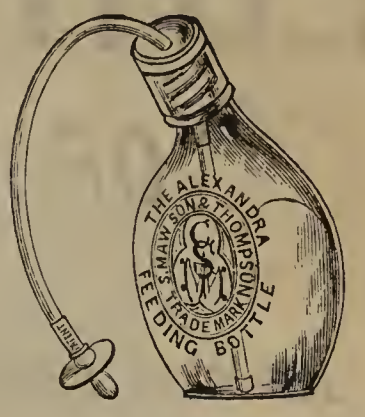

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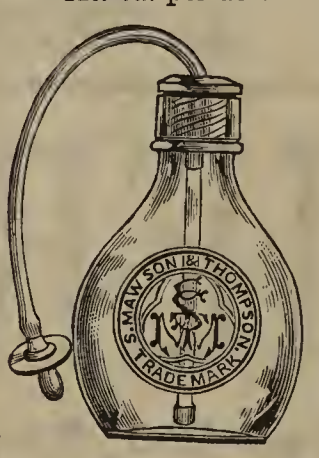

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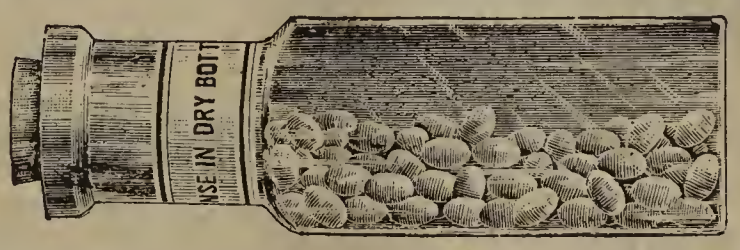
EXACT  SIZE.

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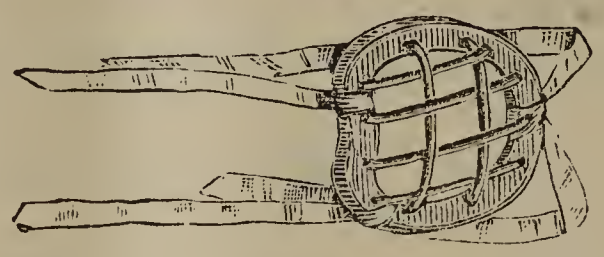

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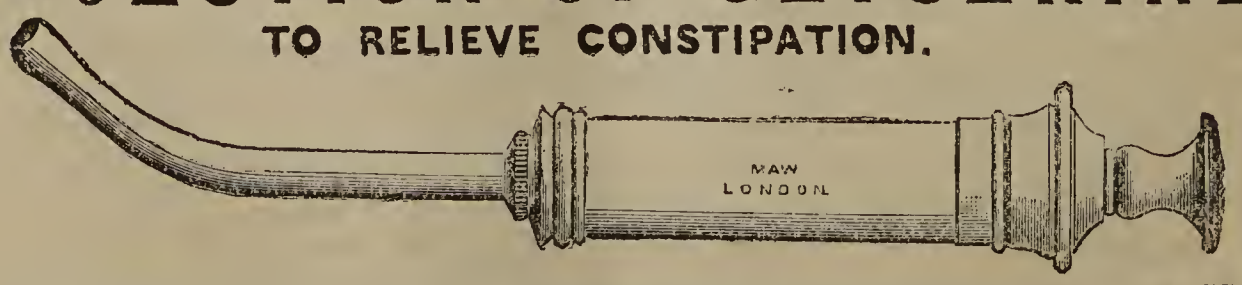

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DIETETICS.

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MEALS.

It is, of course, undisputed that food is eaten for the force it may liberate on being burnt up in the system. For the heat of the human body is well known to be a slow fire, in which the food is being burned, or oxidised by the oxygen inhaled through the lungs. But some of the food has to replace the worn out, used up tissues, and that which contributes mainly to this is the albumen, such as the white of egg, gluten of bread, fibrine of meat, caseine of milk, &c. This albumen is absolutely indispensable to the sustenance of life, and existence can be maintained longer on meat alone than on any other class of food. The animals which depend upon it solely exhibit traits widely differing from those relying on other aliments. Meat appears to enable an animal to discharge more force in a moment than vegetable products, as instanced in the spring of the tiger as compared with the flight of the deer. Hence we find that those nations and people who are meat-eaters exhibit on the whole greater momentum than their differently nourished and less well-fed brethren.

In feeding the sick the benefits following from a cup of well-made beef-tea vary greatly from those conferred by a cup of gruel. The beef-tea seems to enable the system to unlock more force than would otherwise be possible.*

FRUIT.

The vegetable kingdom affords a splendid variety of nutritious and toothsome foods and delicacies, more or less indispensable to man, and capable of sustaining life. But they are best adapted for life in hot countries, and those who live upon them cannot partake so freely of meat as those living in colder climes. Fruits contain subacid and other salts, with much water, all of which exert a goodly influence upon the liver and kidneys; and we have often heard it said by the inhabitants of warm climates that if one would eat fruit freely in summer there would be consequent freedom from piles throughout the year. Often in convalescence, as the tongue is clearing, a bit of fruit will be more grateful than all other gifts Nature could bestow.

OILS.

Coming to oils, we find them an indispensable requisite to all. The ills that follow their withdrawal are multiform and serious. A large share of the wasting diseases of infants, such as rickets, consumption, and scrofula, are oft associated with too little oil. The system seems to store up oil for future use as she does nothing else. The hibernating animals put on an overcoat of fat before they betake themselves to their long wintry sleep. Whenever there is a demand for a greater and prolonged generating of heat, there is need for fat. Those who inhabit Arctic regions find in fat their chief sustenance; and we know how the Laplander's youngster clucks with delight as a piece of whale's blubber comes within his grasp. The hump of the buffalo, camel, &c., is mainly fat, disappearing with starvation. Fat conserves the body heat, and hence the endurance of fat-eating people, and their less likelihood of having cramps in cold water. Dwellers in cold climes are said to care but little for sweets. They do not suffer from consumption; and it is remarkable that the only remedy known for this disease is the food of the Arctic dwellers.

COD LIVER OIL IN HOT WEATHER.

It is generally supposed that cod liver oil is not so well adapted for hot as for cold weather. The fact is, that an excess of any oil is not well tolerated in summer; but that if the other oil be diminished, cod liver oil properly taken would agree as well as at any other season. The body does not withdraw its needs for fat in summer; and those afflicted with consumption will do well to take at such time the Kepler Solution of Cod Liver Oil, which is prepared in malt, &c. *But by no means dispense with oil.*

* The beef-tea ordinarily given patients is an excellent stimulant, but not very nutritious. To retain the nutriment of the meat, peptonise this with zymine.

Kepler Solution and Kepler Malt Extract supplied to the Trade in ¾*-lb. and* 1½*-lb. bottles, at* 22*s. and* 38*s. per doz., retail* 2*s.* 6*d. and* 4*s. each. Zymine* (*Ext. Pancreatis*) *supplied to the Trade in* ¼*-oz. and* 1*-oz. bottles at* 20*s. and* 60*s. per doz., retail prices* 2*s. and* 6*s. each. Above prices are subject to our usual discount.*

BURROUGHS, WELLCOME & Co., Snow Hill Buildings, London, E.C.

S. MAW, SON & THOMPSON'S
BATH GLOVES, RUBBERS, &c.

	Gloves. (Pairs.)	Straps.	Pads.
CALEFACIO OR BADEN, No. 1, soft Brown, per doz. 5/4 &	6/0	9/0	5/4
CALEFACIO OR BADEN, No. 2, hard Brown . . per doz.	6/0	9/0	5/4
CALEFACIO OR BADEN, No. 3, soft Brown, assorted patterns . . . . . per doz.	6/6	9/0	5/4
CALEFACIO OR BADEN, assorted patterns, export quality, per doz.	4/0	(*Red*	*labels*)
CALEFACIO (the U.S.), Striped soft Brown . per doz.	6/6	9/0	5/4

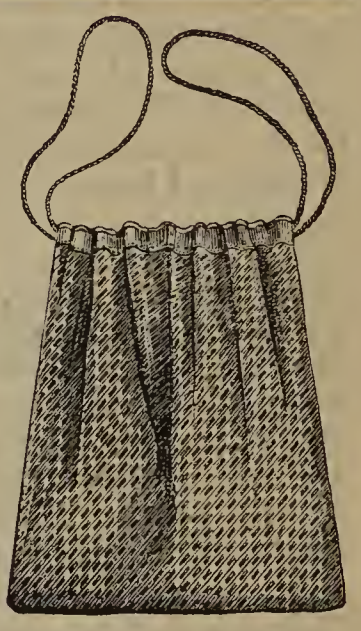
	Gloves. (Pairs.)	Straps.	Pads
HONEYCOMB, White. per doz.	5/4	9/0	5/4
REVERSIBLE, No. 1, one side soft Brown, the other best White Turkish . . . . . per doz.	6/8	11/0	5/4
REVERSIBLE, No. 2, one side hard Brown, the other White Honeycomb . . . . per doz.	6/8	11/0	5/4
REVERSIBLE, No. 3, one side Egyptian Loofah, the other best White Turkish, per doz., *single*	4/0	13/0	—

TURKISH THIN WHITE GLOVES, per doz. pairs, 2/9 & 3/- PADS, per doz., 3/6
Ditto BEST QUALITY ,, 4/9 & 6/- ,, ,, 5/-

S. MAW, SON & THOMPSON'S
SUPERIOR QUALITY
WATERPROOF CHECK SPONGE BAGS

No. 1	2	3	4	5	6	
7 × 6	8 × 7	9 × 8	10 × 9	11 × 10	12 × 11	inches.
6/0	7/0	9/0	11/0	12/6	16/0	per dozen.

For other descriptions see Quarterly Price Current, page 84.



S. MAW, SON & THOMPSON'S
BRIGHTON SPONGE BAGS,
WITH BALL CLASP FASTENINGS, NICKEL-PLATED.

	No. 2	3	4	5	6	
	8 × 7	9 × 8	10 × 9	11 × 10	12 × 11	inches.
CHECK ...	16/0	18/0	20/0	26/0	28/0	per dozen.
PAISLEY ...	18/0	20/0	22/0	28/0	32/0	,,

7 to 12, ALDERSGATE STREET, LONDON.

THE BRIGHTON SPONGE BAG.

NOTE ON STAR ANISE.

BY E. M. HOLMES, F.L.S.

Curator of the Museum of the Pharmaceutical Society of Great Britain.

The recent publication of a description and figure of the true star anise plant in the *Botanical Magazine*, by Sir Joseph Hooker, affords an opportunity of adding to the notes on this subject which appeared in a previous volume of the *Pharmaceutical Journal* ([3], vol. xi., p. 489).

In December, 1880, notwithstanding the publication of *I. anisatum* as the botanical source of star anise in Bentley and Trimen's 'Medicinal Plants,' Dr. Bretschneider, then medical officer to the Russian Embassy at Peking, in 'Notes on some Botanical Questions connected with the Export Trade of China,' states "the plant which produces this article is still unknown to botanists," and he then goes on to remark, "The first authentic information concerning the actual habitat of the star anise tree was furnished by Mr. Piry, in his 'Report on the Trade in the Port of Pakhoo' for the years 1878–1879, in which star anise is said to be brought for exportation to Kin-chow and Pakhoi from the province of Kuangsi, two districts in that province producing the article, Lung-chow on the borders of Annam and the country about Po-se on the West River, close to Yunnan."

Dr. Bretschneider adds a translation from the well-known work on Chinese materia medica and natural history 'Pen t'sao kang mu,' vol. xxvi., fol. 62, in which it is stated that star anise grows in the mountains near the Tso-kiang and Yu-kiang (rivers), and that the kind most valued in China grows in Kuangsi and Kuangtung and in Annan. Dr. Bretschneider remarked that both the above rivers are in Western Kuangsi, the first being a tributary of the West River. The city of Po-se mentioned by Mr. Piry is situated on it. The Tso-kiang is a southern tributary of the Yu-kiang. These notes appear to have attracted the attention of the late Dr. Hance, who in October, 1881, forwarded seeds of the true plant received from Pakhoi to Kew.

In the same year fruit and fragments of the leaves were forwarded by Mr. C. Ford from the Hong Kong Botanical Gardens to Kew.* A few seedlings of the plant obtained by Mr. Kopsch, Commissioner of the Chinese Imperial Maritime Customs at Pakhoi, were grown in the Hong Kong Gardens and flowered in November, 1886, when the plants had attained a height of 9 feet. Some seedlings sent by Mr. Ford to Kew in 1883 flowered at Kew in 1887, and from these the excellent plate given in the *Botanical Magazine* was drawn.

Sir Joseph Hooker points out that the plant must be placed in quite a different section of the genus from that to which *I. anisatum*, L., belongs, since it has broad obtuse perianth segments, and the peduncles are not bracteate at the base. He describes it as a new and hitherto undescribed species, as follows :—

"*Illicium verum*, Hook. f. (*Bot. Mag.*, t. 7005, July, 1888).—*Illicium verum*: foliis elliptico-lanceolatis v. oblanceolatis obtusis v. obtuse acuminatis in petiolum brevem angustatis floribus axillaribus breviter pedunculatis globosis, perianthii foliolis ad 10 orbiculatis concavis coriaceis exterioribus majoribus ciliolatis intimis rubris staminibus ad 10 brevibus, filamento cum connectivo, in corpus carnosum subovoidem confluente, loculis adnatis parallelis subremotis oblongis, carpellis ad 8 stigmatibus brevibus vix recurvis carpellis maturis ad 8 cymbiformibus longiuscule rostratis.

"*I. anisatum*, 'Gært. Carp.,' vol. i., p. 338, t. 69 (Non Linn.)."

The leading features in the plant appear to be the solitary axillary globular flowers, which do not expand fully, the segments remaining convex, the inner segments being red, and the ten stamens, in which the filament forms with the connective an ovoid body. The peduncles are curved and barely half an inch in length. It may be here remarked that a very similar plant, but with smaller and yellowish flowers, has been grown at the Botanical Gardens at Regents Park for the last eighteen years under the name of *I. anisatum*, but the leaves of this species have a sassafras taste. They differ from those of *I. religiosum* in having the midrib prominent below and depressed on the upper surface of the leaf, while in *I. religiosum* the midrib is prominent on the upper and not on the lower surface, and the taste is astringent and terebinthinous.

* *Bot. Magazine*, t. 7005.

THE GLASGOW EXHIBITION.

(*Continued from page* 82.)

As might be expected in a Glasgow exhibition the alkali manufacturers are well represented. Curiously enough, the case of the celebrated home firm of Tennant and Co., of St. Rollox, is as suggestive of general drysaltery as of the alkali manufacture so long associated with the name. A more effective display is the joint exhibit (No. 738) of the Leblanc soda makers who represent the Tyneside chemical industry, namely, the Newcastle Chemical Works Company, Charles Tennant and Partners, the Jarrow Chemical Company and J., G. and W. H. Richardson. Here may be seen the raw materials used in the manufacture, such as coals from Durham and Northumberland, pyrites from Spain, cubic nitre from Peru, common salt from Durham, limestone from Durham and Cork, and manganese dioxide from Spain. The manufactured products, several of which are shown in barrels having glazed lids, consist of caustic soda, very fine soda crystals, bicarbonate of soda, hyposulphite of soda ("antichlor"), bleaching powder and "muriate of ammonia." It may be remarked that in this class of exhibits the articles shown are frequently accompanied by statements indicating the strength in alkali or the degree of purity claimed for them by the exhibitors, but it is evident no useful purpose would be served by the quotation of all these statements here.

Close by (No. 739B) is the exhibit of the representatives of the rival "ammonia process," Brunner, Mond and Co., of Northwich, who are alleged to be now the largest manufacturers of alkali in Great Britain. Only about twelve years have elapsed since the manufacture of soda by the ammonia process was commenced upon a small scale, and even at the time of the last Paris Exhibition in 1878 the details of the process were hardly known with certainty ; but so rapid has been the progress that the output of soda made by it is now said to exceed 100,000 tons per annum. Some fine white bicarbonate of soda is shown as well as a "concentrated crystal soda (sesquicarbonate),'

having a composition represented by the formula $NaCO_3,NaHCO_3 \cdot 2H_2O$, which occurs in acicular crystals.

The Widnes Alkali Company (No. 753) makes a specialty of caustic soda, of which it claims to be the largest manufacturer, the output being given as ranging from 850 to 900 tons weekly. It is claimed that this is the most economical form in which soda can be supplied for soap-making, since not only is there a saving in freight in consequence of the reduced weight of the caustic soda, but the necessary operations for causticizing the soda ash are carried out most economically on a large scale where fuel is cheap. Those who are interested in the utilization of waste may see here some small briquettes made under Rigby's portland cement process from the waste lime mud and guaranteed to stand a tensile strain of one thousand tons on a $2\frac{1}{4}$ inch section.

Gaskell, Deacon and Co., another well-known firm, exhibit (Case 749) soda ash, refined alkali, caustic soda, chloride of calcium, bleaching powder, etc. Among their specialties are their "crystal carbonate" ($NaCO_3 \cdot H_2O$), and bicarbonate of soda, manufactured by an improved process in which the impure solution of soda is treated with carbonic acid and air in blowing vessels, and exposed to a high temperature in "coil" furnaces, by which treatment silica, alumina and the iron of ferrocyanogen are precipitated, while the purified solution after filtration is used in the manufacture of the purer forms of soda. The "crystal carbonate" is represented as containing 82 per cent. of actual carbonate of soda to 17·5 per cent. of water, whilst the ordinary soda crystals contain 34·22 of actual carbonate and 62·84 per cent of water. Some splendid large soda crystals are shown under a glass shade, but the "crystal carbonate" occurs in small crystals, which are said to dissolve readily in water with evolution of heat and not to melt at a low temperature. The use of this latter form of soda is also recommended for the prevention of incrustation and corrosion of boilers, on the ground that it decomposes sulphate of lime, to which scaling is due, with the formation of sulphate of soda, which remains in solution, and carbonate of lime, which does not scale, as well as any chloride of magnesia, neutralizing the hydrochloric acid set free and so preventing corrosion.

The exhibit by Chance Brothers (No. 733) of sulphur recovered from alkali waste seems to mark the solution of one of the most difficult problems in chemical industry. At any rate, whether or no the process, which was recently described in this Journal (March 10, p. 775), proves able to hold its own in the financial fight with other sources of sulphur, an examination of the refined sulphur and "flowers" of sulphur in this case will satisfy any one that the process is capable of yielding a good-looking article. In another part of the building (Court 3, No. 85), sulphur obtained from copper pyrites is exhibited by the Tharsis Sulphur and Copper Company. The mineral worked by this company contains about 50 per cent. of sulphur, 45 per cent. of iron, 3 per cent. of copper and small quantities of gold, silver, lead, bismuth, nickel, antimony, arsenic and silicon. In this case there is a fine stalactite of natural sulphur as well as one of argentiferous lead, besides specimens illustrative of the extraction and treatment of the minerals worked by the Company. Similar products are shown from the Röros Kobbervaerk Mines, Norway (No. 1385).

Of the other cases containing the characteristic products of the alkali manufacture, mention must be made of that of James Muspratt and Sons, Liverpool (No. 765). Besides salt cake, soda ash, caustic soda, bleaching powder, sulphur and sulphuric and hydrochloric acids, there are several barium compounds shown, as well as specimens of magnesia, magnesite and chloride of magnesium, chlorate of potash in crystals and in powder, and chlorate of soda in very fine crystals. Some fine crystalline plates of chlorate of potash are also exhibited in the case of Gamble and Son, of St. Helen's (No. 750), together with chlorate of soda and chlorate of baryta. Similar products of the alkali manufacture are to be seen in the case of Sadler and Co., of Middlesborough, salt from the local deposits and "sulphur stone" from the neighbouring Cleveland hills being among the raw materials used in their production. A specimen of Stassfurt "kieserite" is shown, and it is stated that epsom salt is now exclusively prepared from this compound. Oxalic acid is also largely manufactured by this firm from sawdust. Borax and boracic acid, crude and refined, and as a specially prepared powder for fish preservation, are shown in a tasty manner by Pursell and Co., of Leith (No. 760).

Less attractive to the superficial observer than many other exhibits, but nevertheless extremely interesting, is that of Bell Brothers, of Middlesborough (No. 783). It is a little separated from most exhibits of the same class, being in Court 8; but it will repay the trouble of a visit, not so much on account of the display of "ammonia" soda and allied compounds, as for the insight it gives into one way of obtaining the most important of the raw materials for alkali making. The chloride of sodium used by this firm is obtained from the comparatively recently discovered salt beds of the locality, and the case contains samples of the superincumbent strata and of the solid rock salt itself, in the form of the actual "cores" obtained in boring down to the salt by the Diamond Boring Process. A "core" of salt shown was taken from a depth of 1130 to 1200 feet, and the average depths of the strata are given as sandstone, 90 to 1100 feet; gypsum, 1100 to 1120 feet; and salt, 1130 to 1200 feet. The method of winning the salt from the Durham fields, which differs from that adopted in Cheshire (see *Pharm. Journ.*, [3], xviii., 689), has been already described in detail in this Journal (xiv., 565), but may be briefly recapitulated as follows. The saline deposit is reached by means of a bore-hole, into which two iron tubes of different diameters are placed one inside the other. Water is then run into one of them, and coming into contact with the salt becomes saturated and rises in the other tube as brine to the level at which equilibrium is established. As this is always below the surface, in consequence of the greater density of the brine, the last stage of raising the brine is effected by pumping. The case also contains magmas of crystals of bicarbonate of soda and bicarbonate of ammonia, showing the relative quantity of each required to saturate a given quantity of water. Before leaving this neighbourhood the visitor should make a point of seeing the magnificent crystallization of refined spermaceti in the

case, nearly opposite (No. 784), of Walls and Co., of Glasgow.

Zinc and zinc compounds form the specialty of the practical, though not very attractive case of Grimshaw Brothers, of Manchester (No. 732). This firm manufactures a considerable number of zinc compounds, including the chloride, sulphate, sulphide, ferrocyanide, silicate, phosphate, carbonate, acetate, nitrate, oxide, chromate, bromide and iodide. The chloride would, however, appear to be one of the most important, being used not only in the preservation of wood, but in the sizing, finishing, dyeing and printing of cotton goods. In the sizing it is said to prevent the development of mildew and spotting, but some of the other processes in which it is used by the manufacturers of cotton goods are perhaps less ingenuous. It is prepared in both the liquid and solid form, the latter being sent out in lead-lined barrels, from which it is dissolved out when wanted by a jet of steam. Messrs. Grimshaw also illustrate the recovery of zinc from "galvanized iron" waste, by treating it with an acid solution of chloride of zinc, which dissolves off the zinc, the acid solution becoming neutralized and more concentrated. In addition this firm sends out a solid "double muriate of zinc and magnesia."

The tin compounds form another series of chemical preparations required by the calico printer and dyer which are well represented in this exhibition. Stannate of soda ($NaSnO_3$) is used as a mordant, perchloride of tin ($SnCl_4$) and pink salts ($SnCl_4 \cdot NH_4Cl$) to increase the weight of silk and as mordants, tin crystals ($SnCl_2$) for increasing the weight of silk and adding lustre to Turkey red, and oxide of tin for enamelling. They are shown in the cases of Riley and Sons, of Manchester (No. 743), Garroway and Co., of Glasgow (No. 727), and especially in that of T. Goldschmidt, of Berlin (No. 752), where they are accompanied by specimens of calicoes, silks and velvets upon which they have been used. In this last-mentioned case will be found an illustrated statement as to the capability of perchloride of tin to increase the weight of silk that will probably astonish most persons who read it. It is said that raw silk when boiled loses 23 per cent. of its weight, leaving 77 parts of boiled silk for every 100 parts of raw material taken. When the white boiled silk is treated once with perchloride of tin it increases in weight 7 per cent. as compared with the original weight, so that 77 parts of boiled silk, increased in weight 7 parts, weighs 84 parts. Similarly 77 parts of lilac boiled silk, treated twice with perchloride of tin, increases in weight 17 parts and weighs 94 parts. Blue boiled silk, treated three times, increases 29 parts and weighs 106 parts; red, treated four times, increases 40 parts and weighs 117 parts; maize, treated five times, increases 51 parts and weighs 128 parts; and olive treated six times increases 64 parts and weighs 131 parts. Black silk once treated with perchloride of tin and seven times with iron gives an increased weight of 131 parts and weighs 208 parts, whilst if it be treated three times with perchloride of tin and seven times with iron it increases 183 parts and weighs 260 parts. So much for heavy silks!

The action of the Metropolitan Board of Works in employing manganate of soda for the treatment of sewage at the Barking and Crossness outfalls has given rise for a demand which accounts for its appearance among the exhibits of the alkali makers. It is shown in the case of the Jarrow Chemical Company (No. 759)—who claim to have first introduced it for this purpose and to have already supplied eight thousand tons of it to the Metropolitan Board—as well as in that of the Widnes Alkali Company. This crude manganate of soda is dissolved in water and sufficient sulphuric acid is added to the solution for the production of permanganate, as indicated by a bright pink colour, before being run into the sewage. The Widnes Alkali Company, however, shows also an "ozopermanganate disinfectant, which needs only to be dissolved in water to produce permanganic acid," and thus avoids the use of sulphuric acid. This probably depends upon the well-known decomposition of manganate by water, possibly hastened by the presence of an acid salt. Manganate of soda is also shown by Muspratt and Sons, of Liverpool (No. 765).

As the alum manufacturers also cater for the treatment of sewage and fouled water they may be conveniently referred to here, although their principal products are intended for the dyers and paper makers. Spence and Sons, of Manchester (No. 726), show their "patent alumino ferric," which has a multiplex application in the sizing of ordinary paper, rendering cloth incombustible and purifying sewage and other refuse waters. In illustration, samples of sewage and of Clyde water before and after treatment with aluminoferric are shown, the appearance of which seems to indicate that the compound is most effective in respect to sewage. This firm also shows an enormous crystallization of alum of fine quality in the shape of a hollow cylinder; some beautifully perfect octahedra, illustrating the typical form of alum crystals; ground alum and sulphate of alumina. The Glasgow Alum and Ammonia Company (No. 725) shows a ground refuse intended for sewage precipitation. This case contains specimens of the raw materials, alunite, alum shale and bauxite, and spent shale, as well as alum of different qualities and forms, and sulphate of alumina. There are also several other salts, such as "muriate" and sulphate of ammonia, and white and green copperas. Not to be behind their competitors this firm shows, in another part of the building, near the machinery department, two crystallizations of alum, each weighing 16 tons 4 cwt. Sulphate of alumina, represented to be "almost chemically pure," will also be found in the case (No. 731) of Kurtz and Co., of the Sutton Alkali Works, together with soda products and some very fine chlorate of potash. The case of the Hurlet and Campsie Alum Company, of Glasgow, (No. 735) contains very interesting specimens of alum shale in course of oxidation and fully oxidized, showing very clearly the gradual formation, by weathering, of the asbestos-like native sulphate of alumina. But attention will be most readily attracted to this case by the splendid display of the red and yellow prussiates of potash, which makes it one of the most handsome in the exhibition.

Another very showy case, close by, is that of Stevenson, Carlile and Co., of Glasgow (No. 734), it being devoted to chromium and its compounds. Chrome ore and the grey metal chromium obtained from it are shown, but the eye rests with more pleasure on the fine reds of the brichromates of

potash, soda and ammonia, the beautiful crimson of the chromic anhydride and acid, the purple trichloride, the green oxide, the orange-yellow chlorochromate of potash, and the lemon-coloured chromates of potash, soda and ammonia. Chromate of soda is a very deliquescent salt, and the avidity with which it absorbs moisture is shown by the quantity of liquid in which the crystals stand. Evidently it does not lend itself readily to the conditions of exhibition, but the difficulty appears to be overcome in the case of J. and J. White, of Rutherglen, near Glasgow (No. 746), where the soda salt appears in a dry crystalline condition as one of another very fine series of chromium compounds, including the trichromates of potash and ammonia and some beautiful crystals of chrome alum. There are also in this case two very curious crystallizations of "plate sulphate," coloured green through a trace of chromic sulphate. The chromium compounds are now largely used as pigments for paints and printing inks, in dyeing and calico printing, in leather tanning and photography, generally as oxidizing agents and for the exciting liquids of electric batteries. Indeed the stand of Messrs. White is lighted at night by incandescent lamps supplied with electricity from a chrome battery charged with bichromate of soda. Bichromates are also shown by the Eglington Chemical Company, of Glasgow (No. 751).

(*To be concluded.*)

THE GENUS LUFFA.*

BY JOHN M. MAISCH.

During the last six or eight years the so-called *towel-gourd* has attracted some attention, and the fibrous tissue of the fruit is now found in a number of pharmacies, where it is sold under the names of *vegetable-sponge*, *luffa-sponge*, or *wash-rag*. The plant from which this article is derived is indigenous to Upper Egypt and other parts of tropical Eastern Africa, and belongs to the cucurbitaceous genus *Luffa*, which is confined to the tropics, and is botanically closely related to *Momordica*, the genus yielding the well-known balsam-apple of our gardens; but, while the ripe fruit of the latter is dehiscent in an irregular manner, that of the *Luffa* separates at maturity an operculum or lid, which is formed by a kind of disc upon which the floral organs were situated.

The plant is known as *Luffa ægyptiaca*, Miller, and formerly as *Momordica Luffa*, Linné. It grows to the length of 20 or 30 feet, and has an angular tough stem which climbs by means of long and strong spirally twisted tendrils. The alternate leaves are roundish in outline, with a heart-shaped base, and with the margin divided into five lobes. The flowers are rather large, the corolla of a yellow colour; the staminate flowers in racemes; the pistillate flowers solitary, with an elongated ovary and a three-lobed stigma. The fruit attains a length of from 10 to 20 inches, is 2 or 3 inches thick, elliptic in shape, but thinner towards the base; of a green colour, externally marked by ten blackish longitudinal lines and opens at the apex by a flattish conical lid. The numerous seeds are oval, or oval-oblong, nearly half an inch in length and one-quarter inch broad; flat, slightly margined at both ends and of a dull blackish colour. The testa is finely reticulate, and near the hilum on each side marked with two short ridges forming an obtuse angle. The embryo is of a greenish-white colour and has an oily taste.

* Read before the Pennsylvania Pharmaceutical Association, at Titusville, June 13. From the *American Journal of Pharmacy*, July.

The part used is the net-work of fibres in the interior of the fruit. Strong fibrous bundles are found in the pericarp under each of the longitudinal black lines; similar bundles are also contained in the (normally) three placentas, which project from the pericarp toward the centre of the fruit, are there divided each into two branches and curve back again to the pericarp. These longitudinal fibres, with their anastomosing branches following the same direction, are located in the inner layer of the net-work, while other branches running transversely form a similar outer layer, and in the placentas are arranged in strata, between which the numerous seeds are securely imbedded. To obtain this interwoven fibrous tissue, the ripe fruit is either kept in a warm and damp place for several weeks until the softer parenchyma becomes rotten, when it is removed together with its mucilaginous contents by repeated washing with water; or, without allowing the fruit to undergo this softening process, an incision is made longitudinally through the outer layer of the ripe pericarp, and the soft tissue with contents is removed by soaking in water, pressing with the hands and repeated washing, during which manipulation the seeds are likewise discharged through the longitudinal channels between the fibrous web.

When dry, this net-work is of a yellowish or dingy-white colour, and rather hard and rough, though flexible; it readily absorbs moisture, becoming soft, though retaining its firmness, and in a slightly damp condition may easily be compressed. It is not unlikely that in this state it may be found useful as a surgical appliance for the absorption of liquid discharges, and bandages made of it have been employed to some extent in Europe. This absorbing power, combined with great durability and a certain amount of elasticity, have led, in Germany, to the manufacture of *luffa soles*, which are claimed to be more useful and serviceable in cases of sweating feet than soles made of felt or other material, by completely absorbing the perspiration and still retaining between the meshes a thin layer of air; moreover, they may be readily cleaned by washing with soap and water. The properties mentioned have also caused the material to be made into saddle undercloths which take up the perspiration of the sweating animal.

In Egypt, where the plant has long been cultivated, the luffa sponge is used for straining liquids, for scouring and scrubbing, and as a flesh-brush for friction in certain skin diseases; since its introduction into the United States it has been employed mainly as a bathing sponge and as a flesh-brush, for which purposes it is well adapted in consequence of its lightness, texture, durability, and the ease with which it is cleaned.

The plant is readily raised from seeds and is a rapid grower; if germinated early it will flower and ripen its fruit in the latitude of Philadelphia before the cool autumn weather sets in, a light sandy soil being apparently better adapted for securing its perfection than a heavy and rich soil. Full-grown fruits, not completely maturing before cool weather, may be ripened by keeping them in a warm room; but in this case the fibrous net-work will be more delicate in texture and less resistant to wear. Being an annual of tropical origin, the plant will grow with little or no attention in the Southern States, where it is now raised to some extent as an arbour vine. But the vegetable sponge met with in our commerce is perhaps altogether imported from Europe, and, considering the low price at which it is sold here at retail, is probably of Egyptian, or at least oriental origin. It is imported uncut, or, in other words, in the same shape in which it exists in the fruit, and may be employed in this condition, more particularly as a bathing or washing sponge, since the outer layer is smoother and softer than the inner layer, which is harder and rougher from the, both longitudinal and transverse, direction of the fibres, and from the

projection of placental tissues; hence the inner side is more effective for friction.

While the fruit in its pulpy portion has mainly a mucilaginous, not very inviting taste, it is to some extent used as a food by the poor people of Eastern Africa. The fruit of *Luffa petola*, Seringe, is eaten in China and some of the East India islands, and of the East India species Roxburgh mentions *Luffa petandra* and *L. acutangula* of which the unripe fruit is edible. The last named species is more widely distributed than any other of the same genus, being indigenous not only to Southern Asia, as far northward as Afghanistan, but likewise to the West Indies and to South America as far as Brazil. In the West Indies it is commonly known as *strainer-vine*, very likely in allusion to the use made of the fibrous frame-work of the fruit. A variety of this, or a closely allied species, is *Luffa amara*, Roxburgh, which has also a cucumber-like fruit, about four inches in length and provided with ten sharp longitudinal ridges or angles. The entire plant has a very bitter taste, more particularly the leaves, which, according to Professor Dymock, are used as an external application to sores in cattle. The fruit is cathartic and emetic, and in the form of powder is used as a snuff in jaundice, while the juice of the roasted young fruit is applied to the temples to cure headache.

Luffa Bindaal, Roxburgh, is regarded in Northern India as a powerful remedy in dropsy, and *Luffa echinata*, Roxburgh, is stated by Dymock to be employed in India as a remedy for colic, for cholera and for snake bite, the bitter fibrous contents of the fruit, which is of the size of a nutmeg, being given in substance or in the form of infusion.

Bentham and Hooker recognize ten species of the genus *Luffa*, of which only one is indigenous to America. However, in addition to *Luffa acutangular*, mentioned above, several other American plants are at least closely related to the same genus. For instance, *Momordica operculata*, Linné, is regarded by Grisebach as a variety of *Momordica Charattia*, Linné, and is *Luffa operculata*, Cogniaux, and of other botanists; in Brazil it is known as *buchinha*, the fruit being used for its powerful hydragogue cathartic properties. (See *Amer. Journ. Pharm.*, 1830, p. 144, 1884, p. 623.)

The fruit of the Egyptian luffa was chemically examined by R. J. Weber (*Amer. Journ. Pharm.*, 1884, p. 7), who determined the presence of tannin, a little yellow colouring matter, a small quantity of bitter extractive, chlorophyll, and much bassorin-like mucilage. A chemical investigation of the bitter species of *Luffa* does not appear to have been made; but it is very likely that the bitter constituent represents the diuretic, cathartic and emetic properties, for which many plants of the order of Cucurbitaceæ are noted.

SELECTIONS FROM THE NATIONAL FORMULARY

Issued under the auspices of the American Pharmaceutical Association.

(*Continued from page* 85.)

Emulsio Olei Morrhuæ.

Emulsion of Cod-Liver Oil.

I. Irish Moss Emulsion of Cod-Liver Oil,

Cod-Liver Oil	8 fluid ounces.
Mucilage of Irish Moss (N.F.)	5 „ „
Syrup of Tolu	2 „ „
Flavouring	a sufficient quantity.
Water . .	enough to make 16 fluid ounces.

Pour the Mucilage of Irish Moss into a suitable bottle, add the Cod-Liver Oil in divided portions, shaking well after each addition, and, when a perfect emulsion is formed, add the Syrup of Tolu, and Flavoring, and lastly, enough Water to make *sixteen* (16) *fluid ounces*. Finally, mix the whole thoroughly together.

This emulsion may also be prepared by mixing the Mucilage of Irish Moss with the Oil and other ingredients in a mortar, or, when larger quantities are to be prepared, it may be mixed by some mechanical contrivance.

Note.—When Emulsion of Cod-Liver Oil, particularly that made with Irish Moss, is to be kept for some time, its deterioration may be prevented or retarded by the addition of *one* (1) *fluid ounce* of Alcohol in place of the same quantity of Water, after the oil has been emulsified.

Emulsion of Cod-Liver Oil may also be prepared by any other method capable of emulsifying the oil, the following being given as examples:—

II. Acacia Emulsion of Cod-Liver Oil.

Cod-Liver Oil	8 fluid ounces.
Acacia, in fine powder	1½ troy ounces.
Syrup of Tolu	2 fluid ounces.
Flavouring	a sufficient quantity.
Water . .	enough to make 16 fluid ounces.

Triturate the Acacia with *three* (3) *fluid ounces* of Water to a smooth paste; then add the Cod-Liver Oil, and the Syrup of Tolu, alternately, and in divided portions, triturating well until the last added portion of the Oil is thoroughly emulsified. Next add the Flavouring, and lastly, enough Water to make *sixteen* (16) *fluid ounces*. Finally mix the whole thoroughly together.

III. Glyconin Emulsion of Cod-Liver Oil.

Cod-Liver Oil	8 fluid ounces.
Glycerite of Yolk of Egg (U. S. P.)	2½ „
Syrup of Tolu	2 „
Flavouring	a sufficient quantity.
Water . .	enough to make sixteen fluid ounces.

Triturate the Glycerite of Yolk of Egg (Glyconin) in a mortar with the Oil, added in small portions at a time, and thoroughly incorporate each portion before adding the next. Then, continuing the trituration, gradually add the Syrup of Tolu, and Flavouring. Finally add enough Water to make *sixteen* (16) *fluid ounces*, and mix the whole thoroughly together.

IV. Quillaja Emulsion of Cod-Liver Oil.

Cod-Liver Oil.	8 fluid ounces.
Tincture of Quillaja (N.F.)	1 fluid ounce.
Syrup of Tolu.	2 fluid ounces.
Flavouring	a sufficient quantity.
Water . .	enough to make 16 fluid ounces.

Pour the Tincture into a suitable bottle, then add the Cod-Liver Oil in portions of about *two* (2) *fluid ounces* each, and shake after each addition until a perfect emulsion results. Next add the Syrup of Tolu, and the Flavouring, and lastly, enough Water to make *sixteen* (16) *fluid ounces*. Finally, mix the whole thoroughly together.

An 85 per cent. Emulsion of Cod-Liver Oil may be prepared by mixing in the manner just described:

Cod-Liver Oil	8½ fluid ounces.
Tincture of Quillaja (N.F.)	1 fluid ounce.
Flavouring	a sufficient quantity.
Syrup of Tolu	enough to make 10 fluid ounces.

Note.—Emulsion of Cod-Liver Oil made with Quillaja should not be dispensed without the direction or consent of the prescriber.

V. Dextrin Emulsion of Cod-Liver Oil.

Cod-Liver Oil	8 fluid ounces.
Mucilage of Dextrin (N. F.)	5 „
Syrup of Tolu	2 „
Flavouring	a sufficient quantity.
Water . .	enough to make 16 fluid ounces.

To the Mucilage of Dextrin contained in a suitable

bottle, add the Cod-Liver Oil, first in small portions, agitating each time, until the last added portion is emulsified. Then add the Flavouring, the Syrup of Tolu, and lastly, enough Water to make *sixteen* (16) *fluid ounces*, and mix the whole thoroughly together.

Flavouring.—Since no single or compound aromatic can be devised which would be acceptable under all circumstances as a flavouring for Emulsion of Cod-Liver Oil, the selection of the most suitable aromatic must be left to the prescriber or dispenser. Among those which are found to be most generally serviceable are the following, the quantities given below being intended for *one* (1) *pint* of finished emulsion, though in some cases a smaller or a larger quantity in the same proportions may be preferable:

1.	Oil of Gaultheria.	30 minims.
2.	Oil of Gaultheria.	15 minims.
	Oil of Sassafras	15 „
3.	Aromatic Spirit (N.F.) . .	120 minims.
4.	Oil of Gaultheria.	15 minims.
	Oil of Bitter Almond . . .	2 „
	Oil of Coriander	2 „
5.	Oil of Gaultheria. . . .	10 minims.
	Oil of Sassafras	10 „
	Oil of Bitter Almond . . .	2 „
6.	Oil of Gaultheria.	20 minims.
	Oil of Bitter Almond . . .	20 „
7.	Oil of Neroli	12 „
	Oil of Bitter Almond . . .	12 „
	Oil of Cloves.	2 „

Emulsio Olei Terebinthinæ.

Emulsion of Oil of Turpentine.

Oil of Turpentine	½ fluid ounce.
Acacia, in fine powder. . .	30 grains.
Yolk of Egg	one (1)
Aromatic Elixir.	½ fluid ounce.
Cinnamon Water enough to make	4 fluid ounces.

Triturate the Acacia with the Yolk of Egg, then add the Oil of Turpentine very slowly continuing the trituration, and finally, add the Water and Aromatic Elixir in the same manner.

Emulsion of Oil of Turpentine, or of any *Volatile Oil*, may also be prepared according to the following general formula:

Volatile Oil	½ fluid ounce.
Acacia, in fine powder . .	120 grains.
Syrup	1 fluid ounce.
Water . . . enough to make	4 fluid ounces.

Pour the Volatile Oil into a dry four-ounce bottle, and having corked the latter, agitate it so that the inner surface may be completely wetted by the Oil. Then add the Acacia, and shake again. Finally add the Syrup, and enough Water to make *four* (4) *fluid* ounces, and mix thoroughly by shaking.

Note.—If this general formula is applied to Emulsion of oil of Turpentine, and a product similar to that obtained by the first formula is desired, the Syrup should be replaced by Aromatic Elixir, and the Water by Cinnamon Water.

If a so-called "Emulsion" of a Volatile Oil is to be made more permanent, this may be accomplished by incorporating with it a small proportion of some bland fixed oil, such as Expressed Oil of Almond. Usually, 1 volume of the fixed oil will be sufficient for 2 volumes of the volatile oil.

In this case, the mixture should be made in a mortar by trituration.

Extracta Fluida.

Fluid Extracts.

The Fluid Extracts for which formulæ are given in this Formulary, are intended to be of such a strength that *one* (1) *minim* shall represent *one* (1) *grain* of the air-dry, powdered drug.

Note.—The U. S. Pharmacopœia directs that 100 cubic centimetres of fluid extract shall be obtained from 100 grams of drug. Fluid extracts prepared in this ratio are 5 per cent. weaker than those which are made minim for grain. The difference between the two kinds is not regarded as being of material importance.

General Processes. The Fluid Extracts of this Formulary are to be prepared according to one of the following two general processes, the particular one to be employed being designated in each case.

Process A. The Menstruum contains no Glycerin.

Moisten *sixteen* (16) *troy ounces* of the drug with a sufficient quantity of the prescribed menstruum to render it distinctly damp and to maintain it so after several hours' maceration in a well covered vessel. When the drug has ceased to swell, pack it in a suitable percolator, pour a sufficient quantity of the menstruum on top, and, when the percolate begins to drop from the orifice, close the latter, cover the percolator, and allow the contents to macerate for twenty-four hours. Then permit the percolation to proceed. Receive the first *fourteen* (14) *fluid ounces* of the percolate separately and set it aside. Then continue the percolation with the menstruum until the drug is practically exhausted. Evaporate this second portion—at a temperature sufficiently low to prevent the loss of any important volatile constituent—to a soft extract, and dissolve this in a sufficient quantity of the menstruum so that when this is added to the reserved portion, the product will measure *sixteen* (16) *fluid ounces.*

Allow the Fluid Extract to stand a few days, or longer, if convenient, and filter, if necessary.

Process B. The Menstruum contains Glycerin.

Moisten *sixteen* (16) *troy ounces* of the drug with a sufficient quantity of Menstruum I (see note) to render it distinctly damp and to maintain it so after several hours' maceration in a well covered vessel. When the drug has ceased to swell, pack it in a suitable percolator and pour the remainder of Menstruum I on top. When this has just disappeared from the surface, follow it by a sufficient quantity of Menstruum II. As soon as the percolate begins to drop from the orifice, close the latter, cover the percolator, and allow the contents to macerate during twenty-four hours. Then permit the percolation to proceed. Receive the first *fourteen* (14) *fluid ounces* of the percolate separately and set it aside. Then continue the percolation with Menstruum II, until the drug is practically exhausted. Evaporate this second portion—at a temperature sufficiently low to prevent the loss of any important volatile constituent—to a soft extract, and dissolve this in a sufficient quantity of Menstruum II, so that when this is added to the reserved portion, the product will measure *sixteen* (16) *fluid ounces.* Allow the Fluid extract to stand a few days, or longer, if convenient, and filter, if necessary.

Note.—"Menstruum I" and "Menstruum II" denote the several liquids which will be directed for preparing certain Fluid Extracts.

When it is desired to avoid the use of heat in the preparation of any Fluid Extract, a method of *Fractional Percolation* may be employed, for which directions are given below.

This method involves the use of only *one* kind of menstruum, even in the case of drugs for which two different successive menstrua (I and II) are prescribed in this Formulary. In the case of the latter a sufficient quantity of Menstruum I should be prepared to serve throughout the process.

Fractional Percolation.—Take of the drug, in powder of the prescribed fineness, *sixteen* (16) *troy ounces*, and divide this into three portions of *eight* (8), *five* (5) and *three* (3) *troy ounces*, respectively.

Moisten the *first portion* (8 troy ounces) with the menstruum and percolate in the usual manner. Set aside the first *three* (3) *fluid ounces* of the percolate, and continue until *twenty-four* (24) *fluid ounces* more of the percolate have passed, which should be received in several portions, so that the more concentrated will be separate from the last, weak percolate.

Then moisten the *second portion* of the drug (5 troy ounces) with the most concentrated of the percolates received during the preceeding operation, after the first 3 fluid ounces had passed, and percolate again in the usual manner, using the several reserved percolates, successively, as menstrua. Set aside the first *five* (5) *fluid ounces*, and continue the percolation until *ten* (10) *fluid ounces* more have passed, which should also be received in several portions.

Finally moisten the *third portion* of the drug (3 troy ounces) with the most concentrated of the last reserved percolates, and proceed as directed for the second portion. Collect the first *eight* (8) *fluid ounces* separately, and mix them with the two portions previously set aside so as to make *sixteen* (16) *fluid ounces* of Fluid Extract.

Extractum Sennæ Fluidum Deodoratum.

Deodorized Fluid Extract of Senna.

Senna, in No. 60 powder	16 troy ounces.
Alcohol,	
Water, each	a sufficient quantity.

Moisten the Senna with *six* (6) *fluid ounces* of Alcohol, pack it firmly in a percolator, and percolate it with Alcohol until it is practically exhausted by this menstruum. The alcoholic percolate thus obtained is rejected, and the alcohol may be recovered therefrom by distillation. Then take out the moist powder, dry it, and prepare a Fluid Extract by the Process and Menstruum below mentioned.

Process A (see p. 106).

Menstruum: Alcohol, 1 volume.
Water, 1 volume.

Glyceritum Bismuthi.

Glycerite of Bismuth. Liquor Bismuthi Concentratus. Concentrated Solution of Bismuth.

Subnitrate of Bismuth	1480 grains.
Nitric Acid	4 troy ounces.
Citric Acid	1200 grains.
Water of Ammonia	a sufficient quantity.
Glycerin	8 fluid ounces.
Water	enough to make 16 „

Dissolve the Subnitrate of Bismuth in the Nitric Acid mixed with an equal volume of Water. Add the Citric Acid previously dissolved in *four* (4) *fluid ounces* of Water. Divide the solution into two equal portions. To one portion add Water of Ammonia until the precipitate first formed is redissolved, and then dilute with Water to *eight* (8) *pints*. To this add the reserved portion, stirring constantly. Let the mixture stand about six hours, then transfer it to a paper filter, inside of a muslin strainer, both being folded together. Wash the precipitate with Water, until it is free from Nitric Acid, and by gentle pressure remove as much of the Water as possible. Dissolve the precipitate in a sufficient quantity of Water of Ammonia, evaporate the solution on the water-bath, in a tared capsule, to *eight* (8) *troy ounces*, then transfer it to a graduate, allow it to cool, and wash the capsule with a little Water so as to make the whole volume of liquid measure *eight* (8) *fluid ounces*. Finally add the Glycerin, and filter, if necessary.

Glycerite of Bismuth, when required for immediate use, may also be prepared as follows:

Citrate of Bismuth and Ammonium	2048 grains.
Stronger Water of Ammonia	a sufficient quantity.
Glycerin	8 fluid ounces.
Water	enough to make 16 fluid ounces.

Triturate the Citrate of Bismuth and Ammonia with *six* (6) *fluid ounces* of Water and *four* (4) *fluid ounces* of Glycerine, and add to it gradually just enough Stronger Water of Ammonia to dissolve the salt, and to produce a neutral solution. Then add the remainder of the Glycerine and enough Water to make *sixteen* (16) *fluid ounces*, and filter.

Each fluid drachm contains 16 *grains of Citrate of Bismuth and Ammonium.*

Note.—When this preparation is directed as an ingredient in other preparations, which are required to be filtered when completed, it may be added to them without previous filtration.

If Glycerite of Bismuth should at any time deposit a precipitate, this may be redissolved by the addition of just sufficient Stronger Water of Ammonia.

Liquor Saccharini.

Solution of Saccharin.

Saccharin	512 grains.
Bicarbonate of Sodium	240 „
Alcohol	4 fluid ounces.
Water	enough to make 16 „ „

Dissolve the Saccharin and the Bicarbonate of Sodium in *ten* (10) *fluid ounces* of Water, filter the solution, add the Alcohol to the filtrate, and pass enough Water through the filter to make *sixteen* (16) *fluid ounces.*

Each fluid drachm represents 4 *grains of Saccharin.*

Note.—The Saccharin directed in the above formula is, properly speaking, "anhydro-ortho-sulphamine-benzoic acid," an artificially prepared member of the so-called aromatic series of organic chemicals. It is a body having feebly acid properties, soluble in about 333 parts of water, and in 33 parts of alcohol at 15° C. (59° F.). When neutralized by an alkali, it is quite soluble in water.

The Solution of Saccharin is intended to be used for sweetening liquids or solids, when the use of sugar is objectionable, or when a sweet taste is to be imparted to a liquid without increasing its density.

Pancreatinum

Pancreatin.

Pancreas of the Hog, fresh.	
Water,	
Alcohol	each, a sufficient quantity.

Reduce the fresh Pancreas of the Hog, freed as much as possible from fat and membranes, to a fine paste by means of a suitable chopping machine. Mix it with half its weight of cold water, and knead it thoroughly and frequently during one hour; then transfer the mass to a strainer, express it forcibly, filter the liquid as quickly as possible through flannel, and add to the filtrate an equal volume of Alcohol. Collect the precipitate, drain it, and free it by pressure from as much of the adherent liquid as possible. Then spread it on shallow trays, dry it by exposure to warm air, at a temperature not exceeding 40° C. (104° F.), reduce it to powder, and keep it in well-stoppered bottles.

Note.—If larger quantities of Pancreas are operated upon, and there is risk of its decomposition in presence of the water, it is advisable to saturate the latter with Chloroform, which will retard decomposition for a long time.

If there be added to 4 fluid ounces of tepid water, contained in a suitable flask or bottle, first, 5 grains of Pancreatin and 20 grains of bicarbonate of sodium, and afterwards one pint of fresh cow's milk, previously heated to 38° C. (100·4° F.), and if this mixture be maintained at the same temperature for thirty minutes, the milk should be so completely peptonized that, on adding to a small portion of it, transferred to a test-

tube, a slight excess of nitric acid, coagulation should not occur.

As peptonized milk is chiefly used as a food for the sick, and as Pancreatin is probably most largely employed for the practical purpose of peptonizing milk, it is important to observe the quality of the peptonized product yielded with any specimen of Pancreatin. Peptonized milk, as prepared by the above process, or when the process is allowed to go on to the development of a very distinct bitter flavour, should not have an odour at all suggestive of rancidity. Milk has simply a marked bitter taste when thoroughly peptonized.

In place of Pancreatin, prepared by the formula above given, any other commercial preparation of the Pancreas may be used, provided it reaches the standard of peptonizing power prescribed for the former.

Spiritus Aromaticus.

Aromatic Spirit.

Compound Spirit of Orange (N. F.)	8 fluid ounces.
Deodorized Alcohol	7½ pints.

Mix them. Preserve the product, if it is to be kept in stock, in completely filled and well-stoppered vials or bottles, and stored in a cool and dark place.

Aromatic Spirit may also be prepared in the following manner:—

Sweet Orange Peel, fresh, and deprived of the white, inner portion	16 troy ounces.
Lemon Peel, fresh	2 „ „
Coriander, bruised	2 „ „
Oil of Staranise	16 minims.
Deodorized Alcohol enough to make	1 gallon.

Macerate the solids during four days with 1 gallon of Deodorized Alcohol; then add the Oil of Staranise, filter and pass enough Deodorized Alcohol through the filter to make the product measure *one* (1) *gallon.*

Note.—When good, fresh essential oils cannot be readily obtained for preparing the Compound Spirit of Orange, the second formula may be used. But the product obtained by it should not be employed in mixtures containing *iron*, as the latter would cause a darkening of the mixture.

Spiritus Aurantii Compositus.

Compound Spirit of Orange.

Oil of Bitter Orange Peel.	4 fluid ounces.
Oil of Lemon	1 fluid ounce.
Oil of Coriander	160 minims.
Oil of Staranise	40 minims.
Deodorized Alcohol enough to make	20 fluid ounces.

Mix them.

Note.—One fluid ounce of this Spirit and 15 fluid ounces of Deodorized Alcohol, make 1 pint of Aromatic Spirit.

The essential oils used in this preparation, particularly those of orange and lemon, must be as fresh as possible, and *absolutely free* from any terebinthinate odour or taste. They should be diluted as soon as received, with a definite quantity of Deodorized Alcohol, which will retard deterioration. They should not be kept in stock undiluted, for any length of time, or should at least be kept in bottles completely filled, and in a dark place. The alcoholic solution should be kept in the same manner. If Oil of Curaçao Orange of good quality can be obtained, it is advisable to use this, in place of ordinary oil of orange, as it imparts to the Spirit a finer flavour.

(*To be concluded.*)

MODE OF FORMATION OF GUMS AND GUM-RESINS.

Although these two classes of substances differ, as a general rule, in their mode of formation—the former being the result of chemical changes in the cell-wall, the latter a secretion in the interior of cells—this is not altogether without exception. In some species of *Orchis* true gum or mucilage is secreted in the interior of cells. Intercellular passages or canals are known as "schizogenous," when they result from the simple separation or parting of cells, "lysigenous" when they are formed by the absorption or disappearance of cells or cell-walls. Essential oils and gum-resins are generally formed in a layer of so-called "epithelial" cells lining the cavity or receptacle, which may be either of schizogenous or lysigenous origin, and into which they are diffused through the very thin cell-walls of the epithelial cells. There are, on the other hand, instances in which the cell-wall takes part in the formation of essential oils and resins, as in the lysigenous oil-passages of the Aurantiaceæ.

In a recent paper in the *Berichte* of the German Botanical Society, Herr A. Tschirch describes the mode of formation of a number of essential oils and gum-resins. Copaiva balsam, derived from *Copaifera Langsdorffii* and *officinalis*, is not formed, as is sometimes stated, in schizogenous, but in lysigenous canals. The absorption of the cell-walls and the formation of the resin commences in the parenchyma of the wood, advancing from there to the medullary rays, the libriform and the vessels. The resin-passages in species of *Dipterocarpus*, which yield gurjun balsam, and those in *Eperna falcata*, which yield *Balsamum antharthriticum*, are formed in the same way. In *Styrax benzoin* also, the source of the benzoin of commerce, the resin is not formed in schizogenous, but in lysigenous canals. The formation originates in the medullary rays, advancing from there to the surrounding phlaëm-parenchyma, and finally to the bast-cells and sclereïdes.

The same is, in general terms, the history of the formation of the resin in *Abies* and *Thuja*. But in the various kinds of myrrh, derived from species of *Balsamodendron* and *Boswellia*, the gum-resin is always formed in schizogenous receptacles or in true cells. In *Laurus Camphora* also, in the formation of camphor oil, actual absorption of the cell-walls could not be detected. In young branches it is contained in thin-walled cells situated in the wood near to the medullary rays. The large fissures in old wood filled with camphor are probably of lysigenous origin, like those in the wood of *Andira*, which contain "araroba," and those which contain catechu in *Acacia catechu.*

COMPOSITION OF "MUFFE."

In the neighbourhood of the thermal springs of Valdieri, near Cuneo in Piedmont, a substance is largely used for curative purposes under the name of "muffe" (mould), and is for this purpose extensively cultivated on the surface of wet inclined rocks. It occurs as a scum on the surface of hot springs of a temperature from 56° to 69° C. more or less impregnated by sulphuretted hydrogen; an establishment in the neighbourhood of the springs of St. Martino and St. Lorenzo having a speciality for the cultivation and export of this substance. Professor E. Perroncito and Dr. L. Varalda have investigated the composition of this singular substance, and contribute the results to the Italian botanical journal *Notarisia*. They find it to consist almost entirely of a dense weft of filaments of a filiform schizomycete, *Leptothrix valderia*, among which are interspersed filaments of an *Oscillaria*, and cells of a *Glœocaspa*.

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PRELIMINARY EDUCATION FOR PHARMACISTS.

ALTHOUGH so much has been written and said in reference to the subject of education from a pharmaceutical point of view, it may not be superfluous to direct attention to a recent discourse in which the advances of the past are reviewed, and the still unachieved requirements of the present are pointed out by the President of an American pharmaceutical association. There is sufficient analogy between the conditions affecting the practice of pharmacy here and on the other side of the Atlantic to render such a treatment of the subject interesting as well as useful, especially since it affords evidence that many of the innovations attempted and sought for here have met with approval from the pharmacists of the United States and have in some instances been found actually beneficial. We refer now to an address delivered by Professor C. O. CURTMAN before the Missouri State Pharmaceutical Association at the meeting held last June, the particular subject then dealt with being the preliminary education of pharmacists. In entering upon the consideration of this subject it was admitted that much good had been done by the discussions which have taken place of late years as to the necessity of extending the general scope of pharmaceutical education and of providing for a more thorough practical and theoretical training. Among the beneficial results that have followed are the establishment of pharmaceutical, chemical and microscopic laboratories for the purposes of study, and the introduction of a system of progressive courses, combined with intermediate examinations which admitted of the progress of the students being tested from time to time. In proportion as the legislative regulation of the practice of pharmacy has been carried out in the various States the requirements of examining and licensing boards have been advanced from the very moderate demands at first made upon graduates until they have been brought more into conformity with the needs of modern progress. In this respect our American brethren are in advance of what has been done in this country, but the means by which that advanced position has been attained in the matter of education presents much the same features as the projected course of study which the Council of the Society has for some time past been endeavouring to introduce. The opinion expressed by Professor CURTMAN as to the value of the collegiate teaching and systematic training now carried out in America is that it has been instrumental in raising the position of pharmacists and in every way advantageous. But while fully appreciating the great value of practical collegiate work, and with every desire to encourage systematic training of that kind, he does not think that it supersedes the necessity of apprenticeship. He regards apprenticeship as being in any case essential, as being the only means of teaching promptness and decision in the various situations of actual business life; but he holds that both the training of apprenticeship and systematic collegiate teaching are equally indispensable to a complete pharmaceutical education. In regard to these two points, therefore, he at once endorses the views held by Dr. GREENHOW and those which it has been and is still the object of the Society to carry out. The one phase of education is complimentary to the other, but neither is in itself sufficient to supply all that is required.

There is, however, another very important point to be considered, in regard to which it appears that in the United States, as well as in this country, deficiencies still exist. While the minimum limit of accomplishments required for qualification has been gradually advanced, the status of pharmaceutical pupils on first entering the business has been comparatively neglected. If an adequate degree of school education has not been received before the special professional training begins, it is rarely that opportunity offers for supplying such deficiency, and if offered it is probable that it will not be taken advantage of. Naturally this is to be expected. After a young man has entered a business and proves willing and apt to make himself generally useful, the lack of other qualifications requisite for his future advancement may be overlooked at first and only become known after the lapse of some time. Many may become expert in selling sundries and show excellent tact in serving customers, who for want of the needed preliminary culture find it impossible—or at least very difficult—to acquire the knowledge which is afterwards indispensable for advancing to positions of higher trust. And when the fact of deficient preliminary education is at last recognized it is not easy to apply a remedy. Though private study might do much in that way, the probability is that it will be found an irksome task, and that if attempted it will soon be abandoned by most. Besides this, such occupation would necessarily interfere with the attention that should then be directed to other matters. To those who by indomitable energy surmount all obstacles of this kind and succeed

in forcing themselves to the front all credit is due, but they are few in number, and form the exception. The great point to be attended to in the interests of pharmacy is the necessity for taking steps for preventing the occurrence of any such ill-timed effort, and in that respect the conditions now existing in the United States appear to be very similar to those obtaining in this country. According to the statement of Professor CURTMAN, it is found necessary to turn away applicants for enrolment in the college class books on account of deficient preliminary education, notwithstanding the fact that the authorities are far from guarding the entrance door too vigilantly. And of many who manage to squeeze in the experience is that they find it difficult to follow the lectures and other courses of instruction, and hence are often discouraged at the magnitude of a task which is easy enough to their better prepared classmates. The consequence is that they probably fail to graduate and become a positive detriment to pharmacy; perhaps eventually helping to swell the ranks of those who by sharp practices and unfair competition among their neighbours cast a reproach upon pharmacists in the eyes of an indiscriminating public, much inclined to judge the whole body by the shortcomings of the undeserving. Professor CURTMAN tersely sums up his remarks on the subject by bidding pharmacists remember that with every incompetent apprentice they receive they run the risk of raising up to themselves an unscrupulous competitor.

The question, how far preliminary education should extend is one that is difficult to answer, as there are many opinions respecting it. While some would exact extensive knowledge of the various branches of natural science and an acquaintance with modern, as well as classical languages, others would relax their demands to a ridiculously low standard. As a broad principle it should be remembered, however, that a boy who suits admirably for running errands, or for many of the manual duties of the shop, is not suitable for an apprentice unless he possesses such an amount of school education as would enable him to advance higher. According to the experience of Professor CURTMAN, the most prominent deficiency he has met with in pharmaceutical apprentices is a lack of mathematics, even in the lowest grades. He considers this surprising in an age of mercantile enterprise and close calculation; but it is an experience that has its exact counterpart in the preliminary examinations of the Pharmaceutical Society, and while it points to a defective system of middle class school education, it still more emphatically indicates the necessity of enforcing the rule that a satisfactory preliminary examination should have been passed before a lad is received as a pharmaceutical apprentice. As it now stands that examination is no more than any schoolboy ought to be able to pass with ease. It has frequently been suggested that additional subjects should be added to it, but though progress in this respect must adapt itself to existing conditions and must be gradual, it has long been evident that the passing of the preliminary examination should be made an indispensable condition of apprenticeship, and the expression of opinion on this subject to which we have called attention will serve as a further support to the arguments which have been advanced in favour of making it compulsory.

The second reading of the Pharmacy Acts Amendment Bill is postponed until November 12.

* * *

The Committee stage of the Irish Pharmacy Bill is set down for the 9th inst., but from its position on the paper there is not much probability that it will be reached. Dr. Tanner has given notice that in Committee he will move (1) the insertion of words providing that a person who has practiced as a chemist and druggist between August, 1875, and January, 1888, and fails to pass the examinations prescribed in clause 6, shall have his fees returned; (2) the omission of clause 11, relating to an annual fee to be paid by a pharmaceutical chemist not a member of the Pharmaceutical Society of Ireland; and (3) the omission of clause 13, relating to the notice to be placed outside the premises of a registered druggist stating that he is not licensed to dispense or compound medical prescriptions.

* * *

Another fatal case of poisoning with carbolic acid is reported in the Liverpool papers, which illustrates the danger attending the sale of that article by general dealers, and the necessity of regulations for enforcing the use of a proper poison label. It appears that two women who had been indulging in drink obtained a bottle of carbolic acid from a marine store, and thinking it was rum, they drank the contents. One of them died shortly after being taken to the hospital, and the other, at the time of the report, lay in a critical condition.

* * *

It is announced that in connection with the meeting of the British Medical Association in Glasgow, the Senatus Academicus of the University has resolved to confer the honorary LL.D. degree on Sir William Aitken, M.D., T. Clifford Allbutt, M.D., T. Bridgewater, M.D., J. M'Intyre, M.D., Inspector-General M'Lean, M.D., Surgeon-General Munro, M.D., and F. W Pavy, M.D. We also notice that in the conferring of M.D. degrees last week in the University of Aberdeen, the highest position was awarded to Mr. John Gordon, whose name still appears on the Register as a pharmaceutical chemist.

* * *

It is announced that the second triennial International Congress of Hydrology and Climatology will be held in Paris in 1889 at the commencement of the month of October. Among the subjects suggested for discussion are the precautions necessary to be taken for the precise determination of the temperature of thermal springs; the micro-organisms contained in mineral waters and their influence upon the composition and properties of the water; the influence of bacteriological discoveries upon thermal therapeutics; the resources afforded by thermal therapeutics in the treatment of various diseases; and several questions in climatology.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 1st instant.

Present—the President, Mr. James E. Brunker, M.A., in the chair; the Vice-President, Mr. Draper, and Messrs Allen, Wells, Doran, Charles Evans, Beggs, McCormack, and Dr. Tichborne.

A letter was received from the Secretary of the Pharmaceutical Society of Great Britain, acknowledging the receipt of the Calendar for 1888 of the Pharmaceutical Society of Ireland.

A letter dated July 7 was received from Dr. John William Moore, Registrar of the King and Queen's College of Physicians, intimating that that College intended to petition the House of Commons in favour of the Pharmacy Act (Ireland) Amendment Bill, now being promoted by the Council, and inquiring the names of the members of Parliament who were to introduce the Bill in the House of Commons.

The President said that at the time he received Dr. Moore's letter he was not sure by whom the Bill would be introduced in the House of Commons, but he suggested that the Solicitor-General for Ireland would probably consent to present the petition of the college in that House. The Solicitor-General had since done so.

A letter was received from Dr. Archibald H. Jacob, Registrar of the Royal College of Surgeons, stating that the President and Council of the College had had before them the communication of the Council with reference to the Amendment Bill, and that he had been directed to say that as the Bill had passed through a select committee of one House of Parliament and would probably be advanced in the House of Commons before the College could take any useful action in the matter, the President and Council regretted that they were unable to take at present such active steps as were suggested; but that should any question arise requiring its intervention the College would be happy to confer with the Pharmaceutical Society as to what steps should be taken.

The letter was ordered to be marked "read."

A letter was read from the Honorary Secretaries of the British Pharmaceutical Conference, which is about to be held in Bath, requesting to be furnished with the names of delegates who should go from the Society to the approaching meeting.

The President: It is expected that they will have a very successful meeting. The local men are working the matter up.

Mr. Beggs intimated his intention of attending the Conference; and the Registrar was directed to defer replying to the letter until he should receive the names of the delegates.

The Chairman said a letter had been received on July 27—too late for insertion on the agenda paper—from Mr. Hill, on a very important subject, namely, the expediency of changing the hour for holding the annual meeting in October from 4 o'clock in the afternoon to some hour in the evening. He was himself strongly in favour of such a change; it would, if made, require the sanction of the Privy Council in order to be valid for the next annual meeting. It was important, therefore, that it should be settled that day; but, on the other hand, he was reluctant to ask to have the standing orders suspended with a view to the consideration of the subject now, lest absent members of the Council might hereafter complain of want of notice.

Mr. Wells: Is it only by a bye-law that the hour is fixed?

The President: That is all. It is directed that the annual meeting shall be held at four o'clock p.m. on the first Monday in October.

On the motion of the Vice-President, seconded by Mr. Wells, it was unanimously resolved to suspend the standing orders, and consider the letter of Mr. Hill.

The President read the letter, which was signed by 13 licentiates. It stated that the hour of four in the afternoon had not induced country members to attend the annual meeting, whilst it was almost prohibitory as regarded the attendance of members who were in business in Dublin. Accompanying the letter was a return showing the numbers of members of the Society not on the Council, and of members of the Council who had attended the annual meetings from 1880 to 1887 inclusive; from which it appeared that the largest attendance at any annual meeting had been 19, of whom 13 were members of the Council. He (the President) had always looked on that as an unwholesome state of things, and anything that could be done to increase the attendance of members of the Society at the annual meeting, he should, for his part, be most happy to facilitate.

The Vice-President: We ought to give every possible attention to the request of these gentlemen. Anything that can be done to increase the attendance of members at the annual meeting should be willingly acceded to by the Council. The question is, whether members of the Council who had already attended a meeting in the afternoon could be present at another meeting at eight o'clock; however, we must not consider our own convenience at all.

Mr. Doran said he thought the request a very proper one, and that it should be acceded to by all means.

The Vice-President: How many members of the Society who were not members of the Council attended the last annual meeting?

The President: Five.

Mr. Beggs moved, that in compliance with the memorial the hour for the annual meeting be changed from 4 o'clock, p.m., to 7.30 p.m.

Mr. McCormack seconded the motion, which was unanimously agreed to.

A letter was read from Dr. Laffan, of Cashel, claiming certain rights for medical practitioners in reference to their apprentices. The writer stated that he had a pupil whom pecuniary circumstances had obliged to abandon the medical profession, and he asked the Council to accept the apprenticeship which the pupil had already served him in lieu of the time required by the Council from candidates for the licence. Dr. Laffan stated that he was himself a registered medical practitioner anterior to the passing of the Pharmacy Act (Ireland) of 1875; and he contended that that Act reserved to such practitioners all the rights that it conferred on members of the Society.

The President said what Dr. Laffan wanted was that the certificates he gave to his apprentices should be recognised by the Society. He (the President) wrote to him in reply to his letter stating that no doubt his right to compound and dispense medicines was preserved by the Act of 1875, but that from the beginning to the end of that Act there was not a word about apprenticeship, and that the only binding regulations affecting apprenticeship were those made by the Council of the Society and sanctioned by the Privy Council. Dr. Laffan had, in reply to that letter, written a second one to Mr. Ferrall.

Mr. Ferrall read Dr. Laffan's second letter, dated July 24. It argued that the President's letter had admitted his contention, since, if a certain class of registered practitioners were entitled to keep open shop they must perforce be entitled to take apprentices therein; and if these were deprived of any privileges enjoyed by their fellows anterior to the passing of the Pharmacy Act, it clearly amounted to a curtailment of the privileges of their masters. One of those privileges was that any pupil of theirs might after six

months' service tender such service to the Apothecaries' Hall in full satisfaction of the term required to be spent behind an apothecary's counter.

The President said it was desirable that the distinction which now exists generally in Ireland between medical practitioners and pharmacists should be maintained. They did not want to have medical practitioners if they could prevent it becoming dispensers of medicine.

The Registrar was directed to write to Dr. Laffan, stating that the Council had nothing to add to the information they had already given him.

The President made a brief report on the present position of the Pharmacy Act Amendment Bill, and said that in consequence of the state of turmoil into which the House of Commons had been brought there was not much prospect of getting the Bill through until the autumn session.

A letter was received from the Secretary of the Organizing Committee of the Congresses of Medicine and Pharmacy, to be held at Barcelona next September, inviting the co-operation of the Society.

A donation was received from the American Pharmaceutical Association of a copy of their National Formulary.

On the motion of Mr. Draper, seconded by Mr. Evans, a vote of thanks was passed to the American Association.

On the motion of the President, seconded by Mr. Wells, it was resolved to give the necessary twelve months notice of surrender of the premises at present held by the Society at No 11, Harcourt Street.

Reports from the Examiners of the July examinations were laid on the table.

The President said it appeared from these reports that at the Preliminary examination there were 21 candidates, of whom 12 passed and nine were rejected. At the examination for the Licence there were 12 candidates, of whom four failed. He (the President) was present during Dr. Whitla's examination, and that gentleman was very much inconvenienced by the state of the Museum and the want of a suitable collection of standard specimens.

[The collection of a complete set of materia medica specimens was entrusted to a Committee.]

On the motion of Mr. Allen, seconded by Mr. Wells, Mr. John Evans was unanimously re-elected Examiner in Practical Pharmacy.

On the motion of the President, seconded by Mr. Beggs, Mr. T. W. McMurray, of the Medical Hall, Clonmel, was unanimously elected a member of the Society.

Some financial business having been disposed of, the Council adjourned.

British Medical Association.

FIFTY-SIXTH ANNUAL MEETING.

The British Medical Association commenced its Fifty-sixth Annual Meeting in Glasgow on Tuesday last. In the morning a general meeting of the members was held in the Bute Hall of Glasgow University, when the Council Report, which showed that the membership had increased during the year from 11,107 to 12,265, together with a favourable financial statement, was adopted.

In the evening an address was delivered by the new President, Professor Gairdner, of Glasgow.

President Gairdner, after a few observations on the history of Glasgow as a seat of learning, said the subject of his address would be this :—"For a series of indeterminable ages, from the time, very probably, of Hippocrates downwards to what we call the dark or Middle Ages, the tradition has continuously existed that the healer or physician of the highest class ought also to be, in a very real sense of the word, a naturalist, or perhaps a man of science (physical science being, of course, understood); that it is his prerogative to be trained and exercised after the best manner and according to the most thorough discipline of the science of his age, and that he ought to be (or, at least, that he has been in very remote times) regarded as being admirable and trustworthy as a healer or physician, chiefly in proportion to the confidence reposed in him as a naturalist —that is, a humble, reverent, and exact follower and student of Nature." He treated this topic from a historical point of view ; then sketched modern physic in our colleges and universities, and dwelt upon what is still wanting in the training of the physician. Lastly he discussed the attitude of the medical man towards religion. He said :—"That the active ministry of the healer, if fitly and diligently pursued in a serious and not a sordid spirit, cannot possibly tend to irreverence, or to what I would call essential atheism or godlessness, is, I think, so obvious that it is only wonderful that any doubt should ever have arisen on the subject. That ministry is the ministry of the body, no doubt; physical, therefore, in its aim; physical also, to a certain extent, in its limitations; and I am not one of those who would argue that because it is so the physician is thereby degraded and straitened unless he is also constantly invading the province of the religious teacher. But when we consider how closely the one province trenches on the other, and, further, that in all the greater and graver crises of the lot of man on this earth—birth and death, sickness and health, moral contamination producing disease, and, on the other hand, physical disease inducing moral aberrations, and, with or without these, positive insanity—we must acknowledge that the spiritual element in man is brought, necessarily, into the sphere of the physician's daily work. I am confident there is not a man in this room who will not emphatically agree with me in saying that a physician who even inclines towards irreverence as his habitual attitude of mind is thereby disqualified from performing aright the greatest of all the services that at times he can render to the sick. In this our own time and country, when the thoughts of men, however distracted in details, are seriously bent upon the greatest of all questions, involving both time and eternity, the practising physician who can treat these questions with unseemly levity; or who even stands aside and says that they are out of his reckoning altogether, is an anomaly, and to that extent a man out of his place in our social system and atmosphere. In the case of a man of pure science, or the absolutely devoted naturalist, I can easily recognize, even in the most advanced agnostic (in his own estimation), one who, in the confusions of the present time, is really pervaded by what I make bold to call a Divine spirit; one who in the search after truth and fact (as they are in Nature) is so regardful of these and these alone that he refuses to commit himself to positions in abstract thought that may seem to himself, or to others, to carry implications opposed to the perfect impartiality of his research. But if (as I am most ready to admit) the life and work of the great modern apostle of Evolution tend towards the belief that science in these days, and especially the study of natural phenomena in the organic world, make, on the whole, rather for the weakening and dissolution than for the building up of religion, then it will assuredly be the part of the physician of the future to act as the mediator between the destructive and the constructive influences. Although he can never again become what he was in the early ages, the sole or the chief representative of physical science, he must always be, and must become more and more a man trained in its discipline and familiar with its resources; while, on the other hand, his close relations with suffering humanity, and with

the awful and solemnizing ministrations of life and death, will serve to keep him in a region apart from that of pure science, and one in which, from day to day, the voices from the unseen world (if he will only listen) will be ever sounding close to his ears. The physician of the future will, I believe, be much more, instead of less, inclined, to make his study of the Bible than hitherto, and in this respect will differ greatly from the representative and typical 'doctour of physike' of the 'Canterbury Tales.' But he will study it in the spirit of modern scientific freedom and of historical research, not under the influence of mere tradition and ecclesiastical authority. And thus only, as it seems to me, can the reconciliation of science and religion ever be brought about. The day of orthodoxies is over; the day of real science is only just dawning. Enormous evils have accrued to humanity and to the medical art from a blind reliance upon the traditions of the ages, and often upon traditions wrongly interpreted. 'It is so hard,' writes our humorous and venerable *confrère* across the Atlantic, Oliver Wendell Holmes, 'to get anything out of the dead hand of medical tradition. The mortmain of theorists extinct in science clings as close as that of ecclesiastics defunct in law.' The abuses of blood-letting, of a senseless and obstructive polypharmacy, and of innumerable so-called remedies, either inert or positively mischievous, which have had to be cleared out of the way before medical science and practice could even begin to be reasonably simple and intelligible, have been a lesson to all of us, I trust, as to this 'dead hand of medical tradition.' How can we, of all men, fail to see that the same kind of mortmain, precisely the same or similar dead scholastic orthodoxies, have locked up the living words of the New Testament, and of our Lord Jesus Christ himself, in formulas around which the dust of ages has accumulated, till the dead letter has well-nigh choked out the living and life-giving spirit of Christianity? The beautiful story of a divine life and death, the miracles of healing, the Sermon on the Mount, the Parable of the Prodigal Son, with its ever fresh lesson of the Fatherhood of God; that of the good Samaritan, with its large sense of human brotherhood, are conspicuous by their absence as principles from those creeds of the Church which profess to be the formulated essence of Christian doctrine; and instead of these we have the controversies of the first four centuries, marred and scarred all over with the traces of very human, very bitter, and often sanguinary conflicts; the scrambles for power of this or that bishop, 'lording it over the heritage' in opposition to the very words of St. Peter, and giving to all time an example, not of the 'peace and goodwill' with which the first Christmas-day was ushered in, but rather of the sad prophecy, 'not peace, but a sword,' which only too truly foreshadowed the ecclesiastical as apposed to the Christian *régime*. The physician of the future will do well if he remembers always the pernicious despotism which has been exercised over his own art (though in a minor degree) by the fetters of these dead orthodoxies, and will therefore be very slow to acknowledge their claims upon him to any more than a historical regard, even in the realm of theology. He will say of them, in the noble words of the Westminster Confession which (but for the formula connected with it in our Scottish Churches) might almost be taken as the Magna Charta of Christian liberty in all such documents—'All synods and councils since the Apostles' times, whether general or particular, may err, and many have erred; therefore they are not to be made the rule of faith or practice, but to be used as a help in both.' But I desire you very specially to remark as my own personal anticipation, shared, I have no doubt, by many of those now present, that the physician, in his character as student of nature, will make, and in the end will establish, this claim to emancipation, not in virtue of any irreverent, much less atheistic, tendencies, but for the very reason that he has access to a revelation of God distinct from the written revelation, and requiring a wholly distinct method of investigation. In obedience to this call he will, sooner or later, absolutely decline to walk in the leading-strings of ecclesiastical tradition. And in so doing he will studiously insist upon the Bible, and especially the New Testament, and above all, the recorded life, words, and works of our Lord himself, as containing, by implication, the charter of his emancipation, and the only perfectly free religious atmosphere as yet opened to human thought and inquiry."

The meetings of the Sections commenced on Wednesday morning, the Pharmacology and Therapeutics Section being under the Presidency of Dr. James Morton, of Glasgow.

Dr. Morton, in opening the proceedings, said it was to be regretted that our best-informed pharmaciens were not to be found in the ranks of the medical profession, but among chemists and druggists. The progress of pharmacy, which had of late been rapid, was to be ascribed more to the enterprise and competition of pharmaceutical firms than to the researches and discoveries of the scientific physician. For the purity of the remedies prescribed by the physician reliance had to be placed on the skill and integrity of the pharmaciens of such firms. This was becoming every day more completely the case. He suggested the necessity of some educational test or Government control, and that every medical student during or before his professional curriculum should attend a class to be taught by a well-informed pharmacist. In making this proposal he had no desire to underestimate the knowledge of pharmacy possessed by members of his own profession, but it was not to be expected that under existing arrangements they should attain to a knowledge of this department as accurate and full as that which must be possessed by many of those whose whole time had been devoted to it for many years.

Proceedings of Societies in London.

SOCIETY OF CHEMICAL INDUSTRY.

The Errors and Defects of the Present Revenue System of Charging the Duty on Spirits, and the Means for Remedying them.*

BY B. DERHAM, M.D.

(*Concluded from page* 80.)

I will now hasten to give an account of the instrument and tables which I have submitted to the Inland Revenue Department, which will accurately and expeditiously effect what is very inaccurately effected by the revenue instrument and tables, and which will accomplish the requisite reforms with the least possible alteration of the present mode of procedure.

The best data, and those susceptible of the most accurate determination upon which to found correct tables of strengths, are the specific gravities of the spirits and the percentages by weight of alcohol they contain. Gilpin's celebrated experiments in this field of research furnish us with the necessary data. They were made with spirit having a specific gravity ·825 at 60° F. A series of mixtures containing 100 parts by weight of the spirit, and 5, 10, 15, etc., parts by weight of water, and a second series of mixtures containing 100 parts by weight of water, and 95, 90, 85, etc., parts by weight of spirit, down to pure water, were carefully prepared, and their specific gravities exactly ascer-

* Read at a meeting of the London Section of the Society of Chemical Industry, April 9. From the Society's Journal.

tained by means of the weighing bottle at every fifth degree of temperature from 30° to 80° F. inclusive. Since his day, what we may regard as pure alcohol, having a specific gravity of ·79385 at 60°, has been prepared, its expansion with heat exactly ascertained, and similar experiments to Gilpin's made with mixtures of the absolutely pure spirit and water in carefully determined proportions. From these data I have ascertained that Gilpin's pure spirit, ·825 at 60°, contained 89·133 per cent. by weight of alcohol, consequently I have been enabled to calculate the percentage by weight of alcohol corresponding to each specific gravity contained in Gilpin's tables. But the specific gravities in his tables are irregular, and not arranged in a form adapted to commercial or even convenient for scientific purposes. The next necessary step, therefore, was to deduce from the preceding the percentages by weight of alcohol corresponding to the series of specific gravities, commencing at ·780 and regularly progressing by equal differences of ·001—thus ·780, ·781, ·782, etc., to 1·000—and arrange them in a tabular form. I exhibit a copy of these tables. The degrees of temperature are arranged in a vertical column at the side of each page, and the specific gravities, progressing as described, each at the head of its appropriate column of percentages, in a horizontal line at the top of the page. But although a table of this description is of some value to the scientific chemist, it is of little or no utility for commercial purposes, since it does not express in the accepted and commonly understood notation what the commercial public wishes to know; it is nevertheless the necessary foundation upon which to construct tables adapted to commercial requirements. In estimating the value of spirits for revenue and commercial purposes, the standard unit is 1 gallon by measure of proof spirit; and in the accepted commercial notation the expression "so much overproof" denotes the number exceeding 100 of these standard units to which 100 gallons of a specified spirit are equivalent; and "so much underproof" expresses the deficiency by which the number of standard units *contained in* 100 gallons of the specified spirit falls short of 100. A table of strength therefore is most accurately described as "a table of percentages by measure of proof spirit in pure spirituous liquors;" and these percentages being once ascertained, the ratio holds true for any quantity of spirit, whether for 1 or 100, or any other number of gallons or fractions of gallons. The standard of proof is fixed at 51° F., and is defined as having a weight equal to twelve-thirteenths of that of an equal volume of distilled water. The specific gravity of distilled water at 51° is, according to Gilpin, 1·00063, twelve-thirteenths of which is ·9236 nearly. Spirit having this specific gravity at 51° contains 49·3 per cent. by weight of alcohol, hence 1 gallon contains—

$$\frac{9{\cdot}236 \times 49{\cdot}3}{100} = 4{\cdot}553 \text{ lbs. of alcohol.}$$

I may here point out the advantage, at least for all commercial purposes, of limiting our conception of the proof standard to the weight of alcohol it contains. The attempt to combine the additional notion of bulk perplexes the mind in the effort to grasp the endless variations of bulk and strength, degrees of concentration and dilution of spirit, all ultimately corresponding to a gallon of proof spirit. The idea, for instance, that the greater is contained in the less, the gallon of proof spirit in less than a gallon of a stronger spirit is paradoxical; indeed, if we were to adhere to the conception of bulk, is impossible; whereas the simple fact that 4·553 lbs. of alcohol at any degree of temperature, and in any state of concentration or dilution, are the equivalent of 1 gallon of proof spirit, is easily apprehended.

A little consideration will now show that the true percentage by measure of proof spirit is simply the equivalent in gallons of proof spirit of so many pounds of alcohol contained in 1 gallon of the specified spirit at a given temperature; hence all that is required to convert the table of percentages by weight of alcohol into percentages by measure of proof spirit is to multiply the specific gravities, regarded as expressing the pounds weight per gallon, by the percentage by weight of alcohol, and divide by 100, the result being the pounds of alcohol contained in a gallon of any given spirit; and this value divided by 4·553, the pounds of alcohol in a gallon of proof, gives the number of gallons of proof spirit to which 1 gallon of the supposed spirit is equivalent. A few examples will better illustrate the process and exhibit at the same time the method of computing the true strengths or percentages by measure of proof spirit, which are synonymous terms, and the change effected in the strength by variations of temperature.

The specific gravity of Gilpin's pure spirit is ·839 at 30°; the weight of 1 gallon therefore is 8·39 lbs., and its percentage by weight of alcohol is 89·13; therefore 1 gallon contains

$$\frac{8{\cdot}39 \times 89{\cdot}13}{100} = 7{\cdot}478 \text{ lbs. of alcohol.}$$

One gallon, therefore, is equivalent to

$$\frac{7{\cdot}478}{4{\cdot}553} = 1{\cdot}642 \text{ gallons of proof spirit.}$$

And 100 gallons are equivalent to 164·2 gallons of proof spirit, and the spirit is said to be 64·2 overproof.

The same spirit has a specific gravity ·825 at 60°; 1 gallon therefore weighs 8·25 lbs., and the percentage of alcohol is 89·13 as before. One gallon therefore contains

$$\frac{8{\cdot}25 \times 89{\cdot}13}{100} = 7{\cdot}353 \text{ lbs. of alcohol, and}$$

$$\frac{7{\cdot}353}{4{\cdot}553} = 1{\cdot}615 \text{ gallons of proof spirit.}$$

One hundred gallons being equivalent to only 161·5 gallons of proof spirit, the strength of the spirit at 60° has sunk to 61·5 overproof.

Again, the same spirit at 80° has specific gravity ·8153, and 1 gallon weighs 8·153, the percentage by weight of alcohol still remaining the same.

$$\frac{8{\cdot}153 \times 89{\cdot}13}{100} = 7{\cdot}267 \text{ lbs. of alcohol.}$$

And 1 gallon is equal to

$$\frac{7{\cdot}267}{4{\cdot}553} = 1{\cdot}596 \text{ gallons of proof spirit.}$$

And since the equivalence of 100 gallons of the spirit at 80° is only 159·6 gallons of proof spirit, the strength has further declined to 59·6 overproof.

I now wish to call your attention to the fact that by the employment of true strengths, rightly understood and computed in this manner, identical results are obtained with the same quantity of spirits at all temperatures. One hundred gallons of spirit of specific gravity ·825 at 60°, contract to 98·33 gallons at 30°, and expand to 101·17 gallons at 80°.

Now if we multiply these quantities by the equivalence in proof gallons of 1 gallon of the respective spirits, we shall have their equivalent values in gallons of proof spirit. Consequently at

30° . 98·33 × 1·642 = 161·5 gallons of proof spirit.
60° . 100·00 × 1·615 = ,, ,, ,,
80° . 101·17 × 1·596 = ,, ,, ,,

where it will be observed that the diminished bulk of the spirit at 30°, as compared with its bulk at 60°, is exactly compensated by the increased strength at the lower temperature; and the augmented bulk at 80°, as compared with the bulk at 60°, is counterbalanced by the diminished strength at the higher temperature; whence it is evident that by the employment of the true strengths the estimate of the equivalent value of

a definite quantity of spirit, in gallons of proof spirit, would not be affected by changes of temperature, but that the result would be always uniform, as it should be.

I exhibit a copy of my tables calculated in this manner, and wish to point out that they are the exact embodiment of the results of Gilpin's experiments, and that the arrangement is identical with that obtaining in the present revenue tables. The only difference in form is that the significant and useful specific gravities are substituted for the meaningless indications of the revenue instrument and tables; but even this minute and fanciful difference will be seen to practically disappear when I mention that these specific gravities are themselves the indications of the instrument I have proposed to be substituted for the present revenue instrument, and that the trader who does not care to trouble himself about specific gravities could still continue, with the new instrument, to speak of "indications" with which he is familiar from long usage.

The indications of a hydrometer intended for use with the preceding tables should themselves be the specific gravities. This is the special merit of the instrument I propose, the theory of which I shall now briefly illustrate.

In order that the indications of the hydrometer should be themselves the specific gravities of the liquids in which it floats, it is evidently necessary that the successive repetitions of the scale should correspond to equal intervals of specific gravity. It has long been known—therefore I shall not trouble you at present with an algebraical demonstration of the fact—that this can only be accomplished by making the successive increment to the total bulk for each repetition of the scale equal to the bulk of the scale itself. Bates' saccharometer is a very ingenious mechanical adaptation of this requirement, but it has hitherto escaped the notice of inventors that all the conditions of the problem of the construction of hydrometers on this principle can only be fully satisfied by making the specific gravities of the successive poises bear an exactly defined relation to the initial specific gravity of the series indicated by the instrument to which they belong. When this relation is fully understood and appreciated it will be perceived that we need not be dependent on the assurances of the instrument maker as to the accuracy of our hydrometers, or on a laborious trial with a series of test liquids, themselves liable to inaccuracies, but by the simple examination of the specific gravities of the poises, an operation easily effected. By thus satisfying ourselves that they bear the prescribed relation to the initial specific gravity indicated by the instrument, and by noting that the ratio prescribed by the theory between the weights of the poises and instrument itself is maintained, we can at any time verify the accuracy of our instruments. But to proceed to our demonstration.

The most convenient definition of specific gravity for our present purpose is that—

$$\frac{\text{Weight}}{\text{Bulk}} = \text{specific gravity.}$$

Let W = weight of hydrometer; B = bulk of hydrometer; G = initial specific gravity of the instrument; g = specific gravity of any poise; a = the number of degrees of gravity indicated in the length of the stem; and unity = bulk of the graduated stem; then since the bulks of the poises must be multiples of the bulk of the graduated stem, according to their position in the series—

n = bulk of nth poise,
$n\,g$ = weight of „

By the definition of specific gravity and the construction of the instrument—

$$\frac{W}{B} = G; \text{ and } \frac{W}{B-1} = G + a.$$

Whence $W = BG$; and $\frac{BG}{B-1} = G + a.$

And $B\,a = G + a.$

Again, generally, with nth poise attached—

$$\frac{BG + ng}{B+n} = G + n\,a.$$

Whence, substituting the value of $B\,a$, obtained above—

$$g = 2G + (n+1)\,a.$$

To apply this general formula to our purpose. Alcohol at high temperatures touches specific gravity ·780; hence the range of a spirit hydrometer should extend from specific gravity ·780 to 1·000.

This total interval can be conveniently divided into eleven smaller intervals, each corresponding to ·020 of specific gravity; therefore we shall require ten poises and as many repetitions of the scale, exclusive of the first employment of the scale, which requires no poise. Therefore $G = ·780$ and $a = ·020$; and

1st $g = 1·56 + ·04 = 1·60$
2nd $g = 1·56 + ·06 = 1·62$
3rd $g = 1·56 + ·08 = 1·64$, etc.

And since generally $n\,g$ = weight of nth poise,

Weight of 1st poise = $1·60 \times 1 = 1·60$
2nd poise = $1·62 \times 2 = 3·24$
3rd poise = $1·64 \times 3 = 4·92$, etc, etc.

Again, particularly—

$$\frac{W}{B} = ·780; \text{ and } \frac{W}{B-1} = ·800.$$

$$·780\,B = ·800\,B - ·800.$$

$$B = 40.$$

$$W = 31·2.$$

We have now all the data required for the construction of the following scheme of the hydrometer:—

Bulk of Instrument.	Bulk of poises.	Weight of instrument.	Weight of poises.	Specific gravity of poises.	Gravities indicated at top of stem.	Gravities indicated at bottom of stem.
40	—	31·2	—	—	·780	·800
„	1	„	1·60	1·60	·800	·820
„	2	„	3·24	1·62	·820	·840
„	3	„	4·92	1·64	·840	·860
„	4	„	6·64	1·66	·860	·880
„	5	„	8·40	1·68	·880	·900
„	6	„	10·20	1·70	·900	·920
„	7	„	12·04	1·72	·920	·940
„	8	„	13·92	1·74	·940	·960
„	9	„	15·84	1·76	·960	·980
„	10	„	17·80	1·78	·980	1·000

It will be found by trial that if the total weights in the preceding scheme, for any range, be divided by the total bulk for the same range, the quotient is the specific gravity indicated at the top of the stem; and if unity, which is the bulk of the stem, be subtracted from the total bulk, and the operation repeated, the quotient is the gravity at the bottom of the stem. The values given in the scheme are indeed only ratios; but in the calculation of the details of the instrument we have only to substitute real values to obtain all that is necessary for the construction of the hydrometer.

You are now in a position to judge the merits of the system I have proposed in the place of the present revenue system. The tables give identical results at all temperatures; the strengths therein contained are associated with their natural allies, the specific gravities, and the relations between the two are fixed and immutable, having been conclusively determined by experiments with the weighing bottle, the most exact means of investigation at our disposal. Since the strengths correspond to the specific gravities, the tables can be used directly in conjunction with any instrument or means of ascertaining specific gravities. The indications of the instrument I propose are themselves

the specific gravities, which is the value employed by the excise official in ascertaining the contents of casks; thus an unnecessary and troublesome reference to a specific gravity table is avoided. The instrument also is constructed on scientific principles, and is capable of easy verification. Finally, the necessary reform is effected with the least possible alteration of the present proeedure with which the trader is familiar; the established standard, the proof gallon, the aceepted notation of overproof and underproof, the present procedure in all its details, are alike preserved; the only perceptible difference being that the trader, instead of speaking, for example, of indications 11·6, 30·0, etc., will say indications 835, 867, etc.

And in brief, to complete and emphasize the contrast between the two systems, Sikes first manufactured his instrument, and then made it with all its imperfections, a peg, as it were, upon which to hang the rest of his system; whereas I have followed the more scientific method, namely, to first establish and display in the tables the correspondenee existing between the strengths and specific gravities, and then to provide a hydrometer whieh will furnish these specific gravities, which are the natural key to the strengths.

I should not conclude this paper without a reference to the influenee of the errors and defects of Sikes' system upon the interests of the revenue and manufacturers. From what I have already stated, it is apparent that at temperatures above 51° an over-estimate is made of the trader's stock, which results in a gain to the revenue; and at temperatures below 51° there is an under-estimate, which necessarily occasions a loss to the revenue. It has hitherto been the opinion of the revenue authorities that these excesses and defieiencies compensate and balance each other, and that on the whole transaetions of the year the revenue neither wains nor loses. I do not think that this opinion is justified by the facts of the ease; and I shall now briefly state my reasons for holding a contrary view. The result of my inquiries and investigations has been to satisfy me that the mean temperature of spirits in warehouse closely corresponds to the mean shade temperature of the locality in which the warehouse is situated. This is only what we would naturally expect. It is true that the temperatures of the warehouse in winter do not fall so low as the external temperatures, neither, on the contrary, do they rise as high in the summer; they are more equable, less liable to sudden and violent fluctuations, but the resulting mean is nearly the same in both cases. Now, the mean shade temperature at Greenwich, which is nearly at the extreme south of the kingdom, is 49° F.; henee, if all the operations of the exeise in eharging the duty upon spirits were earried on at Greenwich, the revenue would incur a loss. But the mean shade temperature of the year at Liverpool and Manchester is about 47°, at Glasgow and Edinburgh about 46°, falling nearly to 45° at Inverness. Further, the consumption of spirits, it is well known, falls off enormously in the summer months, when the high temperatures prevail upon which the revenue authorities rely for restoring the equilibrium, whieh must materially reduce the mean temperature of spirits taken out of bond for consumption below the annual mean shade temperature of the locality where they are stored. The influenee exerted by this cireumstance in reducing the mean temperature of spirits taken out of bond for consumption will be better appreeiated when I mention that the mean shade temperature of Seotland, where the greatest bulk of spirit is stored, is only about 41·5° F. during the nine eooler months of the year, in which probably five-sixths of the annual eonsumption is effeeted. Again, from 50,000,000 to 60,000,000 proof gallons, or considerably over one year's consumption, are stored in the bonded warehouses of the United Kingdom, from which fact the necessary inference is, that spirits have been, for the most part, lying in warehouse at least twelve months before being taken out for consumption, during whieh time they will have entirely adapted themselves to the mean temperature of their warehouse. Now approximately two-thirds of the total are stored in Scotland, there being only about 7,000,000 gallons in the warehouses in England; consequently, it is probable that the temperatures of a considerable proportion even of the spirits upon which duty is paid in England, rather approximate to those prevailing in Scotland. Neither must we overlook the influence exerted by the evaporation of the spirits in effecting a reduction of their temperature.

Taking all these circumstances into consideration, I think it probable that we are within the mark in assuming that the mean temperature of all the spirits upon which duty is paid in the United Kingdom is 46° F. In round numbers, duty is annually paid upon some 40,000,000 gallons of proof spirit, which we may assume, for the purpose of our ealculation, to have an average strength of 25 overproof. Forty million proof gallons are the equivalent of 32,000,000 at 25 overproof. Now, the bulks are proportional to the reciprocals of the specific gravities. The specifie gravity of spirit 25 overproof at 51° is ·8907, and at 46° ·8929; therefore—

$$\frac{1}{\cdot 8907} : \frac{1}{\cdot 8929} :: 1 : \cdot 9975$$ { Reduced bulk of 1 gallon at 46°.

$$\cdot 9975 \times 32{,}000{,}000 = 31{,}920{,}000 \text{ gallons,}$$

showing an apparent deficiency, owing to contraction, of 80,000 gallons. But these are 25 overproof; therefore—

$$80{,}000 \times 1 \cdot 25 = 100{,}000 \text{ proof gallons}$$

upon which the duty, lost by the present revenue system, is £50,000.

Of eourse this is only an approximate estimate. Possibly the loss is less; probably it is considerably more, seeing that in the above an uniform rate of eonsumption throughout the year has been assumed, whereas the consumption is much greater in winter than in summer. But I leave you to judge of the validity of the arguments upon which the estimate is founded.

It must not bc supposed that this loss to the revenue is attended by an equivalent gain to the trader. The trader disposes of his stock at the estimate and under thc permit of the revenue offieial, eonsequently he also loses to the extent of the underestimation.

I must not omit to point out that, even if we concede the correctness of the selfish eontention of the revenue authorities, that there is an ultimate equilibrium of excesses and defieieneies in the revenue accounts, this satisfactory balance would not obtain in the accounts of the trader. For it is evident from the meteorologieal data I have eited, that it would be nearer the truth to affirm that the boasted equilibrium in the revenue accounts would be maintained not by compensating the overeharge of the individual trader at one season of the year by a corresponding undercharge at another, but rather that the loss inflicted upon the revenue as well as the trader at one extremity of the kingdom, would be eompensated to the revenue but not to the same trader, by an excessive estimate at the other extremity.

Linnean Society of New South Wales.

Some Reputed Medicinal Plants of New South Wales (Indigenous Species only).*

BY J. H. MAIDEN, F.L.S., ETC.

(1) Botanical diagnoses have been rigidly excluded, as they can readily be obtained from the Flora Australiensis at the plaees indieated.

* From vol. iii. (Series 2nd) of the 'Proceedings of the Linnean Society of New South Wales,' March 28, 1888.

(2) References are given to the Flora Australiensis, but note is made of all differences of synonymy between that work and the "Census of Australian Plants" by Baron von Mueller.

(3) The alphabetical order of species-names has been given, in the belief that that arrangement will be the most generally convenient in a paper of this kind.

(4) Detailed references to the gums, resins, and kinos, also to the essential oils (although medicinal), have been omitted, as these substances form groups which can be conveniently dealt with by themselves.

(5) Some of the plants referred to are better known as "Foods," "Timbers," "Tans," etc., but I have endeavoured to keep strictly to the subject of my paper.

(6) I have given the names of authors of statements wherever I could ascertain them.

(7) This paper may be looked upon as a companion paper to that of Mr. Bailey on 'The Medicinal Plants of Queensland,' in the Proceedings of this Society, vol. v., p. 1.

Since this was written I have observed a short paper by the Rev. Dr. Woolls, entitled 'Plants of New South Wales having Medicinal Properties,' in the *Victorian Naturalist*, p. 103, vol. iv.

In regard to the "New Remedies," it will be well to remember the judicious remarks of Sir Joseph Hooker in his introductory essay on the Flora of Australia, appended to the 'Flora of Tasmania.'

"I have not alluded to pharmaceutical plants: such may exist, and multitudes of the weeds, seeds, and roots of Australia will no doubt enjoy a more or less substantial reputation as drugs, for a period, and then be consigned to oblivion. This is the pharmaceutical history of the plants of all countries that have long been inhabited by civilized man, and Australia will form no exception to them, the fact being, that of the multitude of names of plants that appear in Pharmacopœias, the number of really active and useful plants is extremely small."

Queensland is by far the richest of the colonies in plants concerning which medicinal properties have been recorded; but the great majority of these will be found to be also common to India and the Archipelago, and to have been used by the natives of those countries.

With the exception of some plants not endemic in Australia, which have already been utilized by dwellers in older countries, most of the plants of this continent reputed medicinal, have been inquired into only when their true botanical positions were assigned. We are aware that certain properties are possessed by plants belonging to certain genera and natural orders; when an Australian plant is found to belong to such an order or genus, we can usually make a very sagacious surmise as to its properties. The science of botany, therefore, may save the student of materia medica from groping about, and testing plants in an empirical way. Nevertheless, there is still much empiricism in the study of vegetable materia medica, as it is only in comparatively recent years that the analyst and physician have recognised the enormous mutual advantage of co-operation with the botanist. Yet comparatively few genera have been tested for medicinal properties throughout the world, so that the limit of the aid afforded us by analogy is easily passed.

Australian botany may be said to have been brought into order by the publication of the 'Flora Australiensis,' the oldest volumes of which only date back some twenty-five years. Before that time very few people in these colonies professed any botanical knowledge whatsoever, and our plant-nomenclature was in a pitiable state, empirics adding to the prevalent lack of knowledge by bestowing names on plants without a word of description, increasing the difficulty of the situation by synonymy worse than useless. Anyone need only examine old exhibition literature to be convinced of the truth of my remarks. To Baron Mueller and Mr. Bentham are of course mainly owing the "exact" position which Australian botany holds in this centenary year. The main work of the classification of our plants has already been performed, and the student of materia medica now can reap the advantage. There is no doubt that many observations of early colonists on the medicinal properties of plants have been lost to us through their lack of botanical knowledge, or lack of facilities to have plants named in which they were interested. And considering the circumstances under which many of the pioneers of this colony worked, it becomes a matter of surprise to us, not that they have recorded so little, but that they have been recorded so much, and in such detail, in regard to the economic properties of our indigenous flora. Of course drugs form but one group or division of substances which have been pressed into the service of man.

In fairness to ourselves we must confess ourselves very little indebted to the Australian aboriginal for information as to the medical (or in fact any other) properties of our plants. The poor aboriginal chiefly takes interest in the vegetation as supplying him with his scanty food, or as affording him fibre useful in securing fish and other animal sustenance. As far as we know, the materia medica of the blacks is of a very meagre description, yet the acquisition of even such little knowledge as they are supposed to possess, has been slow and difficult, inasmuch as persons who have lived in a state of nature with them have not been distinguished for either their medical or botanical knowledge. Civilized or semi-civilized blacks frequently know but little about their native materia medica, and the difficulty of obtaining reliable information is enhanced (as I have experienced to a slight extent) through the extreme willingness of town blacks to impart information in regard to any plant which may be shown to them, which impresses one with the thought that they are too willing to oblige. But perhaps this is mainly owing to asking them leading questions.

With the native materia medica of India, for instance, the case is very different. While some remedies are evidently used fancifully, and others for every disease to which the human frame is liable, much of the knowledge in regard to it is exact, the outcome of intelligent observation and enquiry, and the work of the European practitioner to classify the native drugs is a comparatively easy one.

There is an important matter which I have often heard referred to by medical men and others. It may be only an ingenious surmise, but I am inclined to think it is more than that, as evidence to prove its truth is from time to time brought forward. It is this. Native Australian drugs will probably be found peculiarly efficacious in the treatment of diseases, or modifications of diseases, which are co-extensive with their distribution.

The number of really useful New South Wales drugs, as far as our knowledge at present extends, is, as will be seen, but very limited, and in regard to these even, our knowledge lacks precision. It will thus be seen how little trodden has been this particular field of enquiry.

Yet it is not too early even now to attempt to systematize such knowledge as we possess,—this has been the object in view in submitting this humble contribution.

1. ACACIA spp. "Wattles."

The barks of all wattles are more or less astringent, and are used in domestic medicine to make decoctions or infusions which are employed in diarrhœa or dysentery, perspiring feet, some affections of the eyes, and a number of severe and trifling ailments in which an astringent may or may not be of service. Speaking generally, the wattle barks of the dry country are

ragged-looking and poor in tannic acid, while those east of the Dividing Range are more compact and far more astringent.

The astringent principle (accompanied by no injurious substance in large quantity) is present to a more or less useful extent in the barks of scores of genera of our native trees, *e.g.*, *Eucalyptus*, *Banksia*, *Casuarina*.

The gums of some species of wattle are used to a limited extent in domestic medicine and surgery. Vide *Flindersia maculosa*, *infra*.

2. ACACIA FALCATA, Willd., N. O. Leguminosæ, 'B. Fl.,' ii., 361.

Variously called "Hickory," "Lignum vitae," and "Sally." It used to be called "Wee-tjellan" by the aboriginals of the counties of Cumberland and Camden.

This bark, which contains much tannin, was used by aboriginals near Sydney to stupefy fish, and to make embrocations for the cure of cutaneous diseases (Macarthur).

This tree extends to Queensland.

3. ACACIA IMPLEXA, Benth., N. O. Leguminosæ, 'B. Fl.,' ii., 389.

The Rev. Dr. Woolls observes that the bitter bark of this tree probably possesses medicinal properties.

This tree is also found in Victoria and Queensland.

4. ACACIA PENNINERVIS, Sieb., N. O. Leguminosæ, 'B. Fl.,' ii., 362.

"Hickory" or "Blackwood."

The bark (and according to some, the leaves) of this tree was formerly used by the aboriginals of southern New South Wales for catching fish. They would throw the bark or leaves into a water-hole, when the fish would rise to the top and be easily caught. Neither the leaves nor bark contain strictly poisonous substances, but like other species of acacia, they would be deleterious owing to their astringency.

This tree is found in all the colonies except South and Western Australia.

5. ACACIA SALICINA, var. VARIANS, Lindl. (*A. varians*, Benth.), N. O. Leguminosæ, 'B. Fl.' ii., 367.

The "Goobang" of the natives of the western interior.

Sir Thomas Mitchell speaks of the natives using a bough of this tree to poison the fish in water-holes.

This tree is found in the interior of the sub-tropical portion of Australia.

6. ACHRAS LAURIFOLIA, F. v. M. (*Sideroxylon Richardi*, F. v. M. in Muell. 'Cens.,' p. 92), N. O. Sapotaceæ, 'B. Fl.,' iv., 282.

The bark has a remarkably sweet taste, but is at the same time astringent. Dr. Bancroft suggests that lozenges made of an extract of it might prove useful in throat diseases. Following is Mr. Staiger's analysis of the bark:—

Extract (containing glycyrrhizin) . .	30
Tannin.	12
A substance intermediate between india-rubber and gutta percha	0·25
Woody fibre	50
Moisture	7·75
	100·0

This tree extends to Queensland.

7. ACPRYANTHES ASPERA, Linn., N. O. Amarantaceæ, 'B. Fl.,' v. 246.

I cannot find that this plant has yet entered into Australian domestic medicine, but in India it is extensively and variously used, although some of the uses may appear ludicrous to us. It is adminstered in cases of dropsy. The seeds are given in hydrophobia, and in cases of snake-bite, as well as in ophthalmia and cutaneous diseases. The flowering-spikes rubbed with a little sugar are made into pills and given internally to people bitten by mad dogs. The leaves taken fresh and reduced to a pulp are considered a good remedy applied externally to the bites of scorpions. The flowering-spike has the reputation in India (Oude) of being a safeguard against scorpions, which it is believed to paralyse (Drury).

This plant is found in all the tropical and sub-tropical regions of the Old World.

8. ADIANTUM ÆTHIOPICUM, Linn., N. O. Filices, 'B. Fl.,' vii., 724.

Common "Maiden-hair fern."

This plant is said to possess medicinal properties, being slightly astringent and emetic, and it has been used in Europe in making "Sirop de Capillaire," a demulcent drink employed in diseases of the chest.

This fern is found throughout the colonies.

9. ALSTONIA CONSTRICTA, F. v. M., N. O. Apocyneæ, 'B. Fl.,' iv., 314.

"Fever-bark" or "Bitter-bark" tree.

The yellowish-brown, often thick and deeply fissured bark of this tree, is intensely bitter, and possesses valuable febrifugal and tonic properties. It is regularly quoted in London drug-lists. A decoction is sometimes sold in the colonies as bitters. Mr. Christy states that it is used by some English brewers of pale ale for export, as it produces neither headache nor other ill effects of hops. It tastes remarkably like cinchona bark, and seems to partake somewhat of the properties of both quinine and nux-vomica. This drug is undoubtedly worthy of careful experiments by medical men.

The bark contains, according to Palm (who examined it in 1863), a neutral resinous bitter principle* (similar to cailcedrin and tulucunin), a volatile oil smelling like camphor, an iron-greening tannin, gum, resin, fat, wax, protein substance, oxalic acid and citric acid. An analysis of the ash is also given (Watts' 'Dict.,' 1st Suppl., 101).

In the "Organic Constituents of Plants," translated by Baron Mueller from Dr. Wittstein's work, will be found an account of an alkaloid called *alstonine* obtained by Mueller and Rummel from the bark (q.v.).

The correctness of the above results has been disputed by Hesse, who expressed the opinion that the supposed alkaloid was a mixture of *chlorogenine* and *porphyrine* (*Ber. d. Deutsch. Chem. Gesells.*, 1878, p. 2175).

In June, 1879, Oberlin and Schlagdenhauffen announced† the isolation of two alkaloids from this bark, a crystallizable and an amorphous one. They found the bark to be soluble in ether to the extent of 1·038 per cent., and to this ethereal extract their attention was confined. In *Pharm. Journ.*, [3], ix., 1059, is an abstract of their paper, and an account is given not only of the method of preparing these alkaloids, but also of their physical and chemical properties. The crystalline alkaloid occurring in silky tufts of brilliant, colourless, isolated or stellate crystals, is styled *alstonine*‡ while an amorphous nitrogenous residue, possessing alkaloidal properties, obtained by spontaneous evaporation from the mother liquor which yielded *alstonine*, is provisionally termed *alstonicine*.

In 1881 an exhaustive research on this bark was contributed by Hesse to the *Annalen der Chemie*, ccv., 360, of which a careful abstract appears in the *Pharm. Journ.*, [3], xi., 775. Palm's "Alstonin" (notwithstanding the alleged absence of nitrogen) was shown by Hesse to consist essentially of an alkaloid which he had obtained from the bark and called *chlorogenine*. But as Palm's name had priority, Hesse called the alkaloid *alstonine*. But unfortunate confusion has arisen in Mueller and Rummel, and Oberlin and Schlagdenhauffen (*vide supra*) also having given so descriptive a name to substances of different composition. The abstract above referred to gives a very lucid account of the overlapping of various researches, and shows

* Called by him *alstonin*.
† *Journal de Pharmacie et de Chimie*.
‡ Probably Hesse's *porphyrine*.

how the different results obtained by different observers may be reconciled. After this necessary preliminary statement, Hesse gives a full account of the preparation and properties of the alkaloids found by him. They are:—

1. *Alstonine* (synonymous with *Chlorogenine*, and probably identical with Palm's "alstonin"). It is a brown amorphous mass, which can be rubbed to a brownish-yellow powder.

2. *Porphyrine*, a white powder, found in very small quantity.

3. *Porphyrosine*, the examination of which is not yet complete.

4. *Alstonidine*, consisting of colourless, concentrically grouped needles.

Hesse believes that this list by no means completely enumerates the alkaloids obtainable from this interesting bark.

This tree is also found in Queensland.

10. ATHEROSPERMA MOSCHATA, Labill., N. O. Monimiaceæ, 'B. El.,' v., 284.

"Victorian Sassafras."

The bark contains an agreeable bitter, of much repute as a tonic amongst sawyers. It is called "Native Sassafras" from the odour of the bark, due to an essential oil closely resembling true Sassafras in odour. Mr. Bosisto likens the smell of the inner bark to new ale, and says that a decoction from this part of the tree is a good substitute for yeast in raising bread.

It is diaphoretic and diuretic in asthma and other pulmonary affections, but it is known more especially for its sedative action on the heart, and it has been successfully used in some forms of heart disease.

It is prepared of the strength of 4 ounces of the bark to 20 ounces of rectified spirit, and is given in doses of thirty to sixty drops, usually on a lump of sugar. The volatile oil of the bark alone is said to have a lowering action on the heart.

The bark has been examined by N. Zeyer, who has found in it volatile oil, fixed oil, wax, albumin, gum, sugar, starch, butyric acid, oxalic acid, an aromatic resin, iron-greening tannic acid, and an alkaloid which he designates *atherospermine*. See Gmelin's 'Handbook,' also Watts' 'Dict.' See also Mueller and Rummel in Wittstein's "Organic Constituents of Plants," for a second method of preparing *atherospermine*.

This tree is also found in Tasmania and Victoria.

(*To be continued.*)

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The botanical excursion intimated last week took place on Wednesday. The party left the Caledonian Station, Princes Street, by train at 6.20 a.m., reaching Currie about ten minutes to seven. A few minutes walk brought them to the Poet's Glen, which had been fixed upon for the day's practical work. The unusual poverty of wild flowers and the general backwardness of vegetation were again very manifest, and it was observed that many of the deciduous trees were already showing autumnal tints and had even to some extent shed their leaves prematurely. After a pleasant ramble in delightful weather the company returned to town by train, reaching Princes Street at 8.30 a.m. Good specimens of *Campanula latifolia*, *Hypericum pulchrum*, *Lapsana communis*, *Lathyrus pratensis*, *Rhinanthus Crista-Galli*, *Scabiosa succisa* and *arvensis*, *Spiræa Ulmaria*, and *Vicia Cracca* were among the plants collected. This concludes the excursions for the season. They have been thoroughly enjoyed by all who have been privileged to attend them, and it is matter of general regret that some of them could not be carried out on account of unfavourable weather.

Obituary.

JOSIAH THOMAS SLUGG.

We regret to have to report the death, on the 5th inst., of Mr. Josiah Thomas Slugg, Chemist and Druggist, of Chorlton-cum-Hardy, Manchester, in his 74th year. Mr. Slugg formerly took an active interest in the affairs of the Manchester Chemists and Druggists' Association, of which he was at one time Vice-President, and was well known as one who had effectually contributed towards the diffusion of scientific knowledge. According to the *Manchester Guardian* he was the son of the Rev. Thomas Slugg, a Wesleyan minister of some standing. When eight years old he was sent to Woodhouse Grove School, the well-known establishment for the sons of Wesleyan ministers, near Leeds, where he attended the latter portion of the time the science lectures of the late Samuel E. Parker, from whom he imbibed a strong interest in astronomical studies. On leaving school he was apprenticed to the late Mr. W. Dentith, formerly of Market Street. Mr. Slugg began business on his own account, first as a manufacturer of soda water, and subsequently as a chemist and druggist, in Medlock Street, Hulme, from which place he removed at length to Stretford New Road. His studies in astronomical science, which the cares of business had compelled him for a time to lay aside, were reawakened by the perusal of a work by the late Dr. Dick, following whose instructions he made a telescope, with the aid of which he saw, for the first time, the moons of Jupiter. He afterwards constructed an improved instrument; and believing that others would be glad to learn how to make one equally good at a small cost he wrote letters to the local newspapers giving plain directions for that purpose. These letters were reprinted in the *Times* and several other journals, and attracted considerable attention. Receiving from various parts of the kingdom applications for more detailed information upon the subject, Mr. Slugg published two little works entitled, 'The Stars and the Telescope,' in the second of which he explained the mode of constructing a cheap achromatic instrument powerful enough to exhibit the rings of Saturn. At the same time he announced his ability to supply a telescope of this kind for £3—the lowest price up to this period being about £10. Much interest was felt in this experiment by the friends of popular instruction and by persons eminent in science, including the late Earl of Durham, the Hon. Mrs. Ward, authoress of 'Telescope Teachings;' and Sir E. J. Reed. It was by the aid of one of Mr. Slugg's inexpensive telescopes that Mr. Proctor first discerned ice and snow on the planet Mars. In the year 1866 Mr. Slugg was elected a Fellow of the Royal Astronomical Society. He did excellent service as a well-known and generally gratuitous lecturer on various branches of physical science. Besides the two books already mentioned, Mr. Slugg issued a larger work entitled, 'Observational Astronomy,' which contained maps of the stars and a description of the constellations. In 1880 he published his 'Reminiscences of Manchester Fifty Years Ago;' and in 1885, when over seventy years old, an admirable history of the school in which he was educated.

Notice has also been received of the death of the following:—

On the 19th of July, at New York, Mr. William G. Findlater, Chemist and Druggist, late of Aberchirder, Banffshire.

On the 24th of July, Mr. Henry Mace Wavell, Chemist and Druggist, High Street, Newport, I. W. Aged 83 years.

On the 29th of July, Mr. Francis Kirby Rackham, Chemist and Druggist, Lower Marsh, Lambeth. Aged 76 years.

On the 30th of July, after a long and painful illness, Richard Morgan Davies, Pharmaceutical Chemist, of Carmarthen. Aged 71 years. Mr. Davies was a member of the Society from 1842, and for many years filled the office of Local Secretary and Superintendent of written examinations at Carmarthen.

Review.

MANUAL DE MATIÈRE MÉDICALE. By R. BLONDEL. With a Preface by M. DUJARDIN-BEAUMETZ.*

The author of this book appears to be peculiarly fitted for writing upon materia medica by his position as Préparateur des Travaux pratiques d'Histoire Naturelle at the Faculty of Medicine of Paris. Being also a licentiate in natural sciences and a member of the Société de Therapeutique, he may be supposed to be equally competent to discourse on therapeutics.

The book is especially intended for the use of students of medicine and medical practitioners, and consequently physiology and therapeutics are more fully entered into than is necessary for students of pharmacy. It is confined to articles of materia medica drawn from the animal and vegetable kingdoms only, and is limited to those which appear in the official collection of the Faculty of Medicine, a knowledge of which is required for the first examination for the doctorate. A full description of the crude drug is first given, usually accompanied by a figure of the part described. This is followed by a description of the appearance of the drug under the microscope, also accompanied by an illustration, which in most cases is copied from Lanessans' work. A botanical description of the plant is then given, and a summary of the chemistry, physiological properties, and therapeutic uses. Each article is concluded by a brief diagnosis, or means of distinguishing other similar drugs from the one under consideration.

It thus meets the requirements both of pharmaciens and medical students, although it does not appear from the preface that the author is catering for the former class.

In the botanical portion of the manual the nomenclature of Professor Baillon has very naturally been adopted. English readers would probably experience some degree of surprise at meeting with such names as *Delphinium Napellus*, *Peucedanum Ammoniacum*, *Peucedanum Asafœtida*.

Following the same botanist, the balsam of Peru and Tolu trees are made varieties of one species, viz. *Toluifera Balsamum*, the former being attributed to var. *Pereiræ* and the latter to var. *genuina*.

Myrrh is attributed to *Balsamea Opobalsamum*, which is given as a synonym of *Balsamodendron Opobalsamum* Oliv., and *Balsamodendron Myrrha*, Nees. With this determination it is hardly possible to agree; the products of the two last named plants being totally different. The author also attributes Socotrine aloes to *Aloe vera*, L. He apparently does not know the true drug, which gives a different colour reaction from the juice of *A. vera*. The aloes which has recently been imported under the name of Socotrine aloes, but which doubtless is derived from a species nearly allied to *A. vera*, appears to be the aloes he recognizes as Socotrine. Indeed the articles on aloes are among the very few unsatisfactory chapters in the book. As a rule the descriptions are excellent. As a large number of drugs which are not official in the British Pharmacopœia are fully described, the book will form a useful work of reference for English students of materia medica. The therapeutical portion is also specially valuable from having been revised by Dr. Dujardin-Beaumetz. The manual is of a very convenient size, is written in a remarkably clear and concise style, and will probably prove an exceedingly useful work for the class of students for whom it was intended.

* Paris: O. Doin. 18mo. Pp. i.-lvi.; 1-978. 9 francs.

BOOK RECEIVED.

THE PRESCRIPTION, Therapeutically, Pharmaceutically and Grammatically Considered. By OTTO A. WALL, M.D., Ph. G. St. Louis. 1888. From the Author.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

A CORRECTION.

Sir,—At last week's Council meeting it escaped my notice that the President, in his opening remarks, alluding to me in connection with the subject of materia medica, stated that I "still continue to conduct the classes in this subject in the North of England Society." This is an error, as in the forthcoming session Mr. Alfred Wright is announced to deliver the lectures in materia medica.

There is one small error in reporting my own speech, which I shall be glad to be allowed to correct. I am reported to have said we are "the inheritors and custodians of a vast literature on the subject." It is quite true that we have a considerable literature, but what I said was that we are "the inheritors and custodians of the best literature on the subject," and I had in my thoughts at the moment the classical works of Pereira, who was for so many years the lecturer on materia medica in our school, and of Hanbury, who was so intimately connected with our Society and was for some years a member of the Council.

Newcastle-on-Tyne. N. H. MARTIN.

THE MINIMUM SIZE OF PILLS.

Sir,—The difference between Mr. Ince and Mr. Martindale on this interesting subject might be arranged by our favourite mode of adjustment, viz., by compromise and adopting one and a half grains as the standard weight of the whole pill.

I would also suggest a common excipient to secure uniformity of size, consistence and appearance, and would recommend for that distinction our old friend bread crumb, dried and finely powdered, and made into a mass with a definite quantity of water, mucilage, or glyc. trag.

Montrose. GEO. BURRELL.

Shildon.—The *Annals of Botany* is issued at intervals, four parts going to form a volume, for which the subscription price is one guinea, if prepaid to the publisher, H. Frowde, Amen Corner, E.C.

E. Polack.—*Castanea vesca.*

W. J. Shepperd.—(*a*) *Daucus Carola.* (*b*) *Filago germanica.* (*c*) *Agrostemma Githago.* (*d*) *Hypericum perforatum.* (*e*) *Senecio Jacobœa.* (*f*) *Geranium dissectum.* (*g*) *Ononis campestris.* (*h*) *Galium*, probably *palustre*: send better specimen. (*i*) *Galium verum.* (*k*) *Prunella vulgaris.* (*l*) *Cuscuta Epithymum.* (*n*) *Polygala vulgaris.*

J. M. Clagur.—(1) Probably nitric acid might be a means of detecting the presence of cotton-seed oil. See a paper by Mr. Conroy (*Pharm. Journ.*, [3], xi., 933). (2) It would not be practicable to quote the titles always in full; but the contractions are generally sufficient to identify well-known periodicals, and when further information is desired we shall be happy to supply it.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Humphrey, Martyné, Burroughs and Wellcome, Wilkinson, Short.

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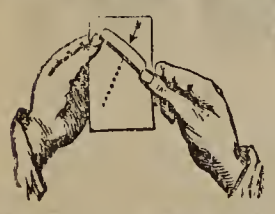
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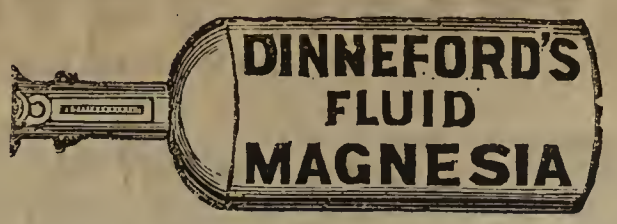

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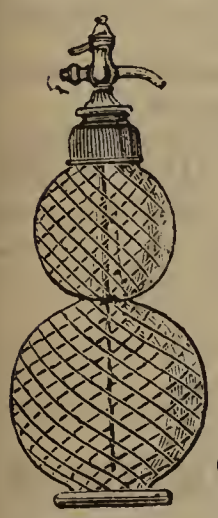

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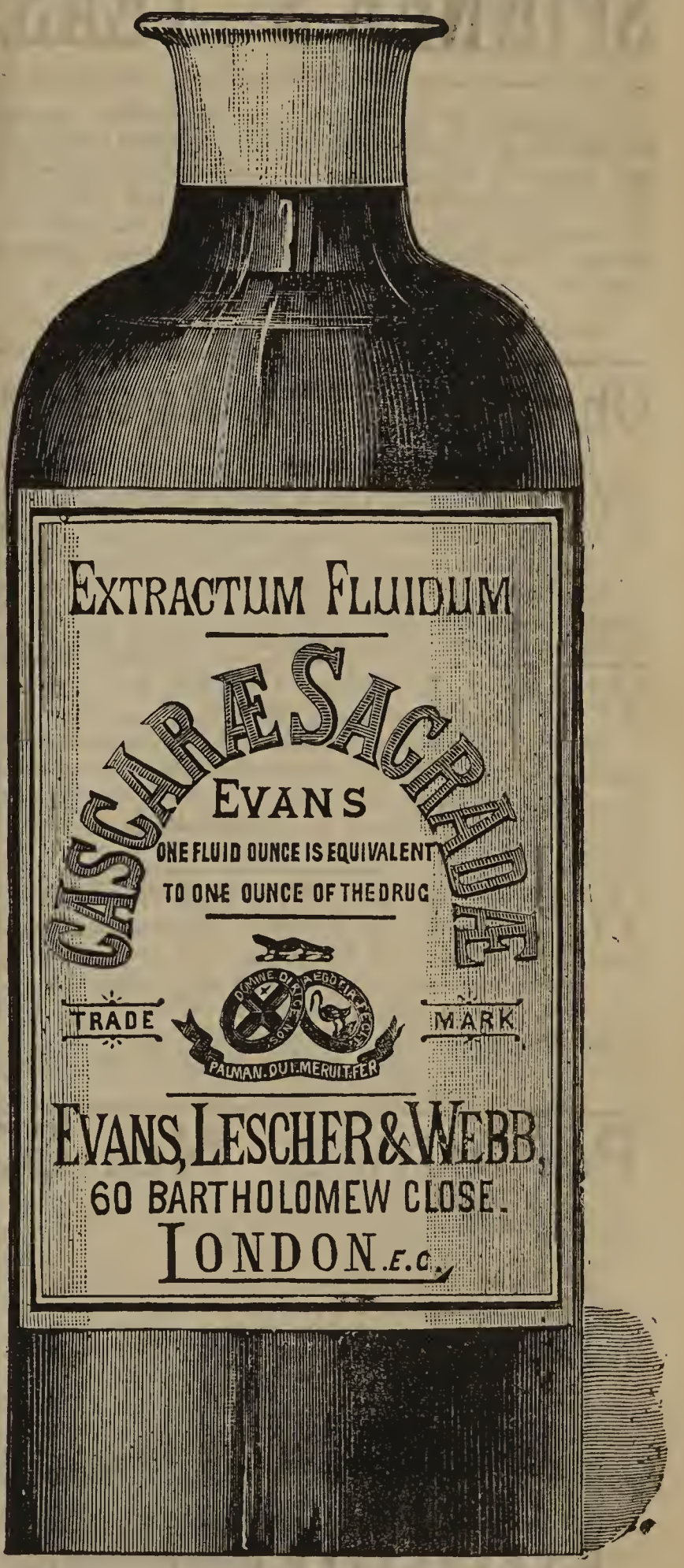

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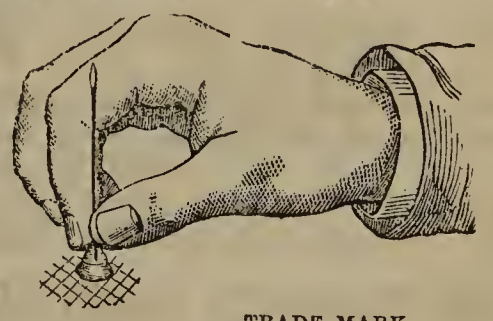

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MINOR.

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,, J. HORNE, Aberdeen. | ,, F. WALKER, Everton.
,, T. L. INMAN, Batley. | ,, E. WILLIAMS, Liverpool.
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JUNE—

Mr. J. W. BYGOTT, Huddersfield. | Mr. G. PENTY, Manchester.

JULY—

Mr. H. DRING, Brandon Parva. | Mr. H. COLLEY, Grimsby.
,, E. MASON, Stretford. | ,, T. BRIGGS, Halifax.
,, G. BURNETT, Manchester. | ,, A. GEORGE, Manchester.
,, H. E. HOLT, Manchester. | ,, Jos. THOMAS, Rochdale.
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The WINTER SESSION of 1888-89 will commence on Oct. 1, when an introductory address will be delivered by Dr. Cullingworth, at 3 p.m.

Two entrance science scholarships of 125 guineas and 60*l.* respectively, open to all first-year students, will be offered for competition. The examination will be held on the 26th, 27th, and 28th September, and the subjects will be chemistry and physics, with either botany or zoology, at the option of candidates.

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Assistant Physician—Dr. James Anderson.
Surgeons—Mr. Couper; Mr. Rivington; Mr. Waren Tay; Mr. McCarthy; Mr. Frederick Treves.
Assistant Surgeons—Mr. Reeves; Mr. C. Mansell Moullin; Mr. Hurry Fenwick; Mr. F. S. Eve.
Obstetric Physician—Dr. Herman.
Assistant Obstetric Physician—Dr. Lewers.
Ophthalmic Surgeons—Mr. Waren Tay; Mr. F. S. Eve.
Physician to the Skin Department—Dr. Stephen Mackenzie.
Aural Surgeons—Dr. Edward Woakes; Mr. T. Mark Hovell.
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Midwifery—Dr. Herman.
Toxicology—Dr. C. Meymott Tidy.
Botany—Dr. F. Warner.
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Practical Chemistry—Mr. F. J. M. Page.
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Diseases of the Ear—Dr. Edward Woakes.
Diseases of the Throat—Mr. T. Mark Hovell.
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The SESSION 1888-89 will commence on Monday, October 1st, 1888. An old Student's Dinner, which will take the place of an opening ceremony, will be held in the New Library at 7.30 p.m. The Chair will be taken by Jonathan Hutchinson, Esq., F.R.S. The New Buildings, which were opened by their Royal Highnesses the Prince and Princess of Wales, on May 21st, 1887, afford more than double the accommodation which was provided formerly.

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PARIS.—Wanted, a competent ASSISTANT, who speaks French. Apply to SWANN, Chemist, 12, Rue Castiglione, Paris.

AN ASSISTANT, experienced in good class trade. Accurate Dispenser. Minor qualification preferred, but not necessary. Apply to W. SCHACHT & Co., English and Foreign Chemists, 26, Finsbury Pavement, E.C.

IMMEDIATELY.—An ASSISTANT, about 22 years of age, accustomed to a good class light Retail. Must be an accurate Dispenser. Apply, stating height, age, salary, with reference, and carte de visite (to be returned), to T. E. MILLIDGE, 124, High St., Tonbridge.

A QUALIFIED ASSISTANT to Manage a Branch. Sleeping and sitting room accommodation provided without board. Personal interview preferred. 2 assistants kept. Apply, P. BOULLY & Co., 85, Bishop's Rd., Bayswater, W.

JUNIOR ASSISTANT wanted. In-door. Mixed business. Apply, P. C., Meadow House, Meadow Lane, Leeds.

AN APPRENTICE wanted. Must be well educated and of gentlemanly appearance. Apply, YOUNG & Co., Chemists, Harbour St., Ramsgate.

A COMPETENT ASSISTANT, with good experience for a Dispensing and Family business. Apply with usual particulars, and enclosing carte, to D., care of Messrs. Evans, Son & Co., Liverpool.

JUNIOR ASSISTANT, in Light Retail and Dispensing business. One who requires time for study. SHEPLEY, 169, Brockley Rd, S.E.

OUT-DOOR.—An active and obliging ASSISTANT for a brisk ready-money Retail, where four are kept. Salary to commence at £80 per annum. Enclose photo and state age, height, and experience, to E. J. KITSON, 1, Broad St., Worcester.

ASSISTANTS WANTED.

A QUALIFIED Assistant. About 25 years of age. Personal applications after Tuesday next. Jones & Bowles, 3, Newland Terrace, Kensington, W.

IMMEDIATELY.—A good Junior, for a light Retail and Dispensing business. Age about 22. One only kept. Time allowed for study. Apply, personally if possible, to F. W. Sandy, 302, Mare St., Hackney.

AN Assistant wanted for August 27, to manage a new branch. Out-door. Well up in Prescribing and Teeth Extracting, and accustomed to Mixed business. Apply, stating age, salary required, and references, to D. Innes, Chemist, Stalybridge. To a gentleman seeking a permanency, a good opening occurs.

JUNIOR Assistant, who understands Post Office duties. Must be fairly up in his business, and well recommended. Apply, stating experience, height, salary required, references, &c., to Manager, 52, Queen's Rd., Brighton.

A QUALIFIED Assistant to manage a branch. Single. Indoors. Teeth extracted. Apply, stating age, height, references, salary required, to T. H. Ness, Chemist, Torquay.

DEMONSTRATOR wanted for the Liverpool School of Pharmacy. Apply, stating age, qualification and salary required, to the Principal, Mr. J. S. Ward, F.C.S., 36, Oxford St., Liverpool.

A QUALIFIED Assistant to manage a business in Liverpool, principally upon commission, and with a view to purchasing it. Apply, stating age, reference, &c., to Pharmakon, care of Messrs. Evans, Sons & Co., Wholesale Druggists, Liverpool.

FOR good class general Retail and Dispensing business near town, a gentlemanlike Assistant, about 22. Qualified. Must be agreeable in manners, and of an active disposition. Salary £4 a month. Home comforts. Also Manager for Branch (with some capital). Statim, Edwards & Sons, Queen Victoria St.

AT once.—Junior Assistant. In-door. Usual particulars. Allen & Lloyd, Aldershot.

COMPETENT Assistant for Mixed Country business. Apply with full particulars, and stating salary required, indoors, to Arthur Carlton, Chemist and Druggist, 18, Long Causeway, Peterborough.

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JUNIOR Assistant in Mixed business. Outdoor. One studying for Minor. Time allowed. Usual particulars to Townsend, Long Sutton, Lincs.

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ENERGETIC and trustworthy Assistant required for quick ready-money business. Out-door and no Sunday duty. Permanency with good salary for suitable man. Timothy White, Chemist, Portsmouth.

MESSRS. BLUNT & EVANS, Chemists, Market Pl., Derby, require Assistant, out-door.

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ASSISTANTS WANTED.

AT once, a smart Junior, age about 26. If able to Extract Teeth preferred. J. Beedzler & Co., 18, Norton Folgate, E.C.

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IN-DOOR Assistant, about 25, for cash business, W. Liberal salary to a suitable man. Also Junior. Apply, stating experience, and, if convenient, enclose carte, to H., Messrs. Hodgkinson & Co., 198, Upper White Cross St., E.C.

IMMEDIATELY.—A Junior for a few weeks. Apply, with full particulars, stating age, experience and salary required, to Hopwood & Son, Richmond, Surrey. Personal application preferred.

BUSINESSES FOR DISPOSAL.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

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COLWYN Bay.—Re J. H. Holmes.—For immediate disposal, the Stock-in-Trade, Fixtures, &c., of a Chemist and Druggist. The Fixtures, which are very handsome, cost about £600, were made by Treble of London, about 4 years' ago, and are as good as new. The Stock is also in good order. Inspection may be made on the premises any day between the hours of 10 a.m. and 4 p.m., until Thursday, the 16th day of August, 1888, when the tenders will be received and opened at my office, at 12 o'clock noon. Further particulars may be obtained on application to J. W. B. Brown, Unity Buildings, 14, Temple St., Birmingham, trustee.

GLOUCESTERSHIRE. Genuine Retail. Best shop front in town, with good cellarage and every convenience for business. Lofty 10-roomed house, with kitchen and good garden. Private entrance. Double front. Exquisite scenery. Excellent opportunity for a gentleman seeking health and retirement. Apply, G. H., care of Messrs. Southall Bros. & Barclay, Birmingham.

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ASSISTANT wishes to enter a genuine established Business, where the owner is wishing to retire, with a view to becoming a PARTNER in the business. Has had long and varied experience, and is capable of acting as Manager. Reference given. ASSOCIATE, care of Mr. Steeper, Chemist, Swineshead, Boston.

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5.	Hanley ...	,,	926	,, 30.	,,	450.
6.	Birkenhead	,,	760.	,, 60.	,,	350.
7.	Essex ...	,,	600.	,, 22.	,,	400.
8.	Lincolnshire	,,	500.	,, 45.	,,	250.
9.	Essex ...	,,	450.	,, 50.	,,	375.
10.	Nottingham	,,	400.	,, 25.	,,	200.
11.	London, N.	,,	400.	,, 45.	,,	187.
12.	Hanley ...	,,	360.	,, 30.	,,	250.
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Some of above, newly established, increasing rapidly.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

SPECIAL NOTICE.

The Society's Libraries and Museums in London and Edinburgh will not be open in the evening during August and September. The Library and Museum in London will be closed during the first fortnight in September. The Library and Museum in Edinburgh will be closed from August 20th to September 4th, both dates inclusive.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

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OF THE

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BY PROFESSOR WYNDHAM DUNSTAN.

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BY PROFESSOR ATTFIELD.

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BY PROFESSOR GREEN.

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Demonstrations will be given by Mr. E. M. Holmes, the Curator of the Museum, on Thursdays, at 10 a.m., commencing on October 4th.

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Lectures and Demonstrations will be given every week by Mr. Joseph Ince, on Tuesdays, Thursdays and Fridays, at 5 p.m., commencing on October 2nd. Laboratory work in Practical Pharmacy will be carried on from 3 to 6 p.m. on Mondays and Wednesdays.

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Alet	10/	..	50	38/	..	..
Apollinaris	6/3	5/	50	25/	100	39/
Birmensdorf	12/	..	50	48/	..	..
Bonnes	12/	10/	50	48/	50	40/
Bourboule (La)	11/	..	50	42/	..	..
Bussang	7/	..	50	28/	..	..
Carlsbad	10/	..	50	40/	..	..
Condal	..	14/	..	..	50	56/
Contrexeville "Le Cler"	8/	..	50	32/	..	..
Do. "Pavilion"	9/	..	50	35/	..	..
Ems	7/	..	50	28/	..	..
Flitwick	12/	..	..	..	..	..
Friedrichshall	13/	10/	25	25/	50	40/
Glesshubler, double-size bottles	11/	..	25	21/	..	..
Do. claret-shape „	8/	5/	50	29/	100	36/
Homburg	10/	..	50	38/	..	..
Hunyadi-Janos	15/	13/	25	30/	50	50/
Joliannis-Brunnen	6/	5/	50	23/	100	36/
Kissengen	11/	..	50	45/	..	..
Kreuznach	11/	..	50	45/	..	..
Kronenquelle	10/	..	50	40/	..	..
Marienbad	10/	..	50	38/	..	..

NAME.	Per Dozen. Bots.	Per Dozen. ½ Bots	Original Packages. Bottles.	Original Packages. Bottles.	Original Packages. ½ Bottles	Original Packages. ½ Bottles
Missisquoi	18/	..	24	35/	..	..
Mont Dore	10/	..	50	40/	..	..
Oberbrunnen	10/	..	50	40/	..	..
Orezza	12/	..	30	28/	..	..
Pullna	12/	8/	40	36/	40	25/
Roisdorf	6/	..	50	25/	..	..
Rosbach	6/	5/	50	24/	100	36/
Royat	9/	..	50	34/	..	..
Rubinat	15/	..	25	30/	..	..
St. Boës	12/	..	50	48/	..	..
St. Galmier Badoit (Still)	6/	..	50	22/	..	..
Do. Noël (Sparkling)	6/	4/	60	26/	100	34/
St Moritz	12/	..	50	48/	..	..
Salvator	..	9/	..	..	50	36/
Schwalbach	8/	6/	50	30/	50	24/
Selters	6/	4/	50	23/	50	16/
Sulis	6/	5/	50	23/	100	36/
Tarasp	12/	..	30	28/	..	..
Taunus	5/6	4/6	50	22/	100	32/
Vals (Société Springs)	8/6	..	50	32/	..	..
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Victoria Ofner	14/	10/	25	27/	50	38/
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Copaiba, with or without Name, best, in oval boxes	,,	5/9	Do. do.	6/6	—	9/-
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Sandal-wood Oil, Flexible, Foreign, in round boxes	,,	20/-	Do. do.	—	23/-	—
Tar, Norwegian, in square boxes	,,	6/-	Do. do.	—	7/-	—
Terebene, pure (10 drops), in round boxes...	,,	12/-	Do. do.	13/-	—	20/
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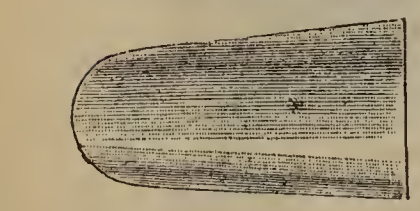

Fig. 5.

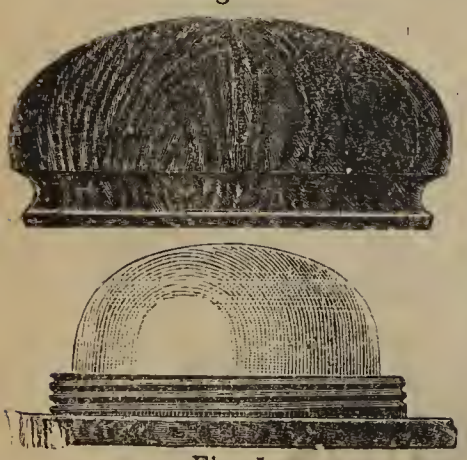

Fig. 1.

Fig. 3.

Fig. 4.

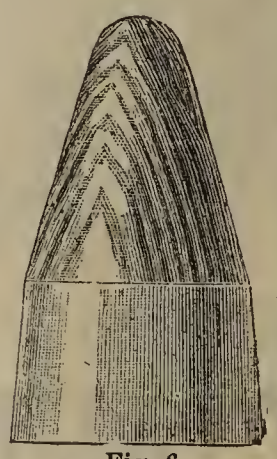

Fig 6.

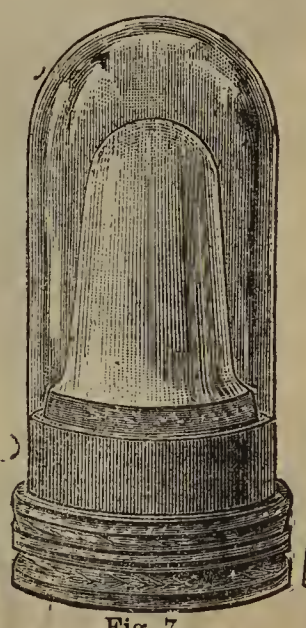

Fig. 7.

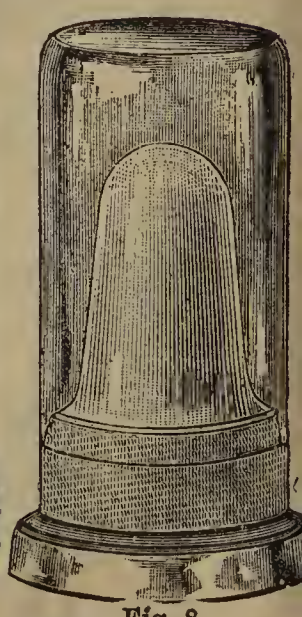

Fig. 8.

Fig. 1.	In Ebony Cases, flat for the pocket	per doz.	6/-
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Fig. 3 & 4.	In Boxwood Cases, per doz., 2/8 and 4/-; in Vegetable Ivory	,,	4/- and 6/-
Fig. 5.	In White Opaque Glass Jars, with Red Celluloid Caps	,,	2/6 and 3/6
	Mounted, in Stoppered Bottles	,,	6/6
Fig. 6.	Mounted on Vegetable Ivory, in Glass Bottles, Screw Metal Caps	,,	4/6
Fig. 7.	On Boxwood Mounts, Glass Covers	,,	3/6 and 5/9
	On New Glass Mounts, Glass Covers	,,	3/6, 4/-, 5/6, 8/-
Fig. 8.	On Glass Mounts with Glass Covers	,,	4/6 and 6/-

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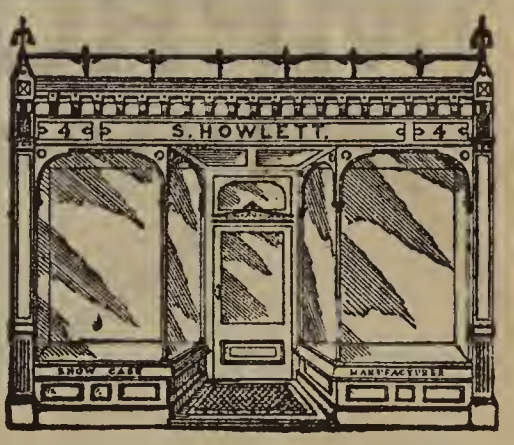

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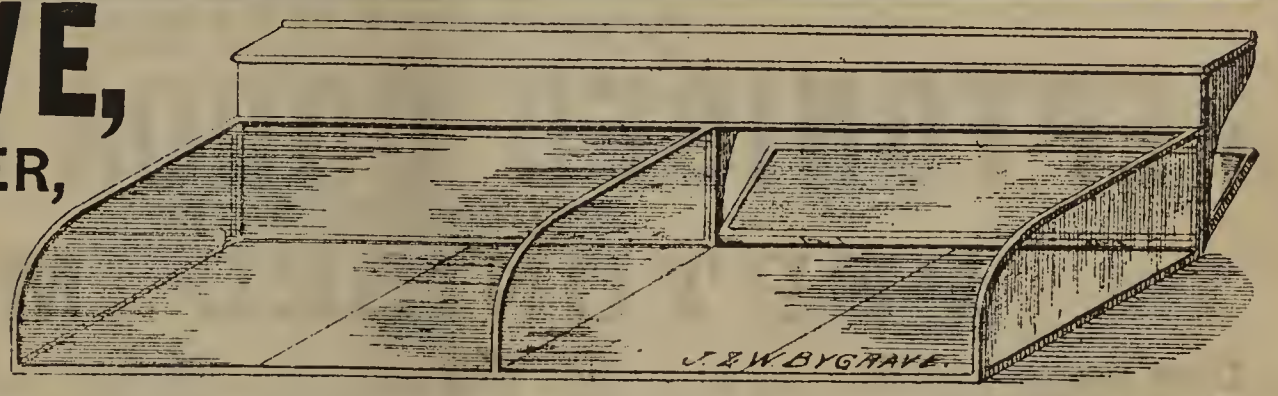

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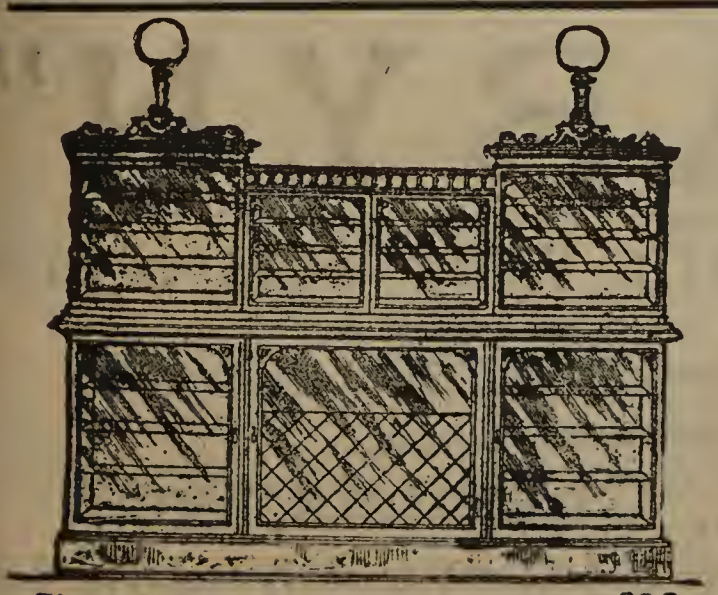

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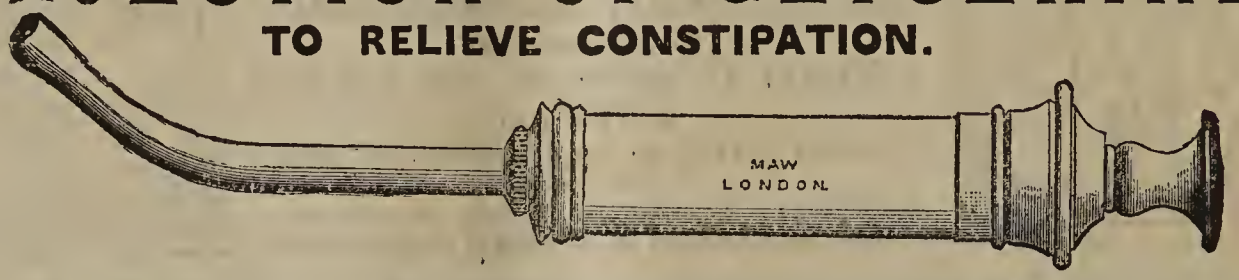

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Is made from the Choicest Hops Grown.

HAY'S HOP ALE ESSENCE

"Supplies an excellent stomachic, appetising and agreeable summer drink."
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BATH AS A HEALTH RESORT.

As Bath will be the temporary home this year of the British Pharmaceutical Conference and the British Association some description of the city and its neighbourhood will doubtless, on that account, no less than by reason of the important position held by Bath as a health resort, be of more than ordinary interest to the readers of this Journal.

The city presents many features of interest that cannot be easily exhausted in a temporary sojourn. It is well built and beautifully situated on the slopes of hills rising on the north side to as much as 700 feet, and on the south side to some 500 feet. The universal grey tint, due to the weathering of the freestone (Bath oolite), which has been almost invariably used as the building material, strikes the beholder from the railway as being somewhat monotonous, though on closer inspection the uniformity of the colour of the really imposing crescents and streets is found to add to their impressiveness. The business parts of the city lie in a nutshell, clustering about the Abbey, forming a cheerful centre, and containing as good shops as are to be found out of the metropolis. Furniture is a speciality of the place, which has earned a character in this respect for good taste and workmanship. Crescents are a peculiar feature of Bath. The most notable are the Royal Crescent; still higher, Lansdown Crescent; and as smaller, though hardly less beautiful, especially in respect to their situation, may be mentioned Camden, Widcombe and Cavendish Crescents. Pulteney Street reminds one of Portland Place, London, in its width and general proportions. A climb to some vantage ground will be well repaid by the bird's eye view that presents itself. Wherever the pedestrian mounts he can hardly go wrong; but for good view points in the daytime, Lansdown and Camden Crescents are both within an easy half hours' walk from the Abbey, and the panorama after the lamps are lit, as seen from Beechen Cliff, affords a satisfactory object for an after-dinner stroll. The much used quotation from Macaulay, where he compares favourably the charms of Bath with the masterpieces of Bramante and Palladio, however impressive in its sonorousness, does not convey much probably to the average Philistine; but avoiding all high-flown and exaggerated language, it will perhaps readily be conceded by anyone having the slightest acquaintance with Bath and its beautiful country surroundings, that very few places, in the United Kingdom especially, can vie with it.

The present city is of comparatively modern origin, but has for all that a very respectable past. The evidence is pretty clear that the neighbouring and commanding height of Salisbury was a stronghold long before the Roman invasion, though it was during the Roman occupation that Bath became a place of the first importance. The abundance and completeness of the Roman remains show that it must have been a very favourite place of residence, due no doubt largely to its hot springs. Then came the Saxons; stone coffins in abundance, and coins from the mints of several Saxon kings having been found some feet above the level of the Roman ruins. Osric, king of Northumbria, is said to have founded the monastery which occupied the site of the present Abbey, and King Edgar was crowned at Bath in 973. The record then continues pretty complete through later Saxon times, and up through Norman to mediæval times, portions of the old city walls, which were strengthened by Charles I., being still in existence.

The Abbey is of no great interest, and to say that the living is in the hands of the Simeon Trustees is sufficient to indicate the character of its services. The pretty little Victoria Park is well worth a visit, especially as it comprises an Arboretum as well equipped and named as any outside our national collections at Kew. The genus *Gleditschia*, of interest to pharmacists from its having been lately stated that the species *triacanthos* yielded an alkaloid of value, is well represented here. The country around Bath is rich in archæological treasures. The unique little Saxon church at Bradford-on-Avon is worth a journey of many a long mile to see, and parish churches of interest—notably Bitton, with its genuine bit of long and short—abound.

For the geologist it would be difficult to find a more convenient centre, nearly every formation, from the Silurian upwards, being represented within a radius of a few miles. The local Museum has an excellent geological collection, and is especially strong, as such a collection should be, in illustrations of the district. Wild flowers are abundant in the immediate neighbourhood, and the flora is fairly rich in species, but otherwise is of no special interest to the botanist. A curious discrimination of plant life in the matter of choice of soils is noticeable here. Limestones, like the mountain limestone, Bath Oolite and Lias, are very prevalent, and on the former the foxglove luxuriates; but, so far as strict observation through a series of years can determine, it never strays to the neighbouring limestone rocks of very similar composition. A marked example occurs at the Wick Rocks, about five miles from Bath, a picturesque gorge caused by an eruption of mountain limestone, which forms a sort of oasis covered with foxglove, whilst not a single specimen is to be found on the surrounding Oolitic or Liassic strata.

The climate partakes of the mildness and equable character of that of the West of England generally, but affords marked differences within certain limits, due to the altitude and slope and aspect of the hills. The higher slopes of Lansdown, of Bathwick Hill and Coombe Down, are decidedly bracing, the lower situations being warmer and more sheltered. There is an erroneous impression that Bath is unduly hot in summer, whereas in hot summers it is much cooler than places further east in the same latitude. For instance, in June, 1888, when the thermometer rose to 90° at Oxford, Norwich and Gloucester, to 92° at Nottingham, and to 94·5° at Greenwich, it was never higher than 84° at Bath, and this will be found, on consulting the carefully-kept registers at the Bath Literary and Scientific Institution, to represent a general average in this direction. On the other hand, in very cold winters, Bath is warmer by about the same number of degrees. On the very cold day, December 25, 1860, when the thermometer fell to −8° at Nottingham and Cambridge, at Bath it stood at +11°, making a difference of 19°. The rainfall is about 30 inches, which is sufficient without being excessive, and the country rarely presents that parched appearance to which dwellers in the east of England, where the rainfall averages about 15 inches only, are so accustomed. At a distance no further west than Bristol the rainfall is from 30 to

40 inches, in Cornwall it is from 40 to 50 inches, and in the higher parts of that county as much as 75 inches.

The great attraction of Bath is of course its hot springs; the normal temperature of the water of the two principal springs is 117° and 120° F. The flow during twenty-four hours is as much as 385,000 gallons, and taking mean contents per gallon as 150 grains, this discharge represents the daily removal of a quantity of solid rock material amounting to no less than 3·68 tons. The character of the water is what is called "indifferent," the principal ingredients being sulphate of lime and alkaline chlorides. Large quantities of nitrogen gas are also evolved.

According to the analysis by Mr. Charles Ekin, the water of the King's Bath spring contains:—

	Grains per gallon.
Calcium	28·1449
Strontium	traces
Magnesium	3·6569
Lithium	traces
Potassium	2·1540
Sodium	9·4200
Aluminium	traces
Iron	0·8400
Arsenic	traces
Silica	2·5012
Sulphuric Acid	74·2915
Chlorine	19·3900
Carbonic Acid	6·1600
Ammonia	0·0175
Nitrogen as nitrates	0·0035
Total Solids	165·2

The calcium is almost entirely in the state of sulphate and the iron probably exists as carbonate held in solution by carbonic acid gas. The water is of great organic purity and the mere trace of nitrates present clearly indicates that all surface water is effectually cut off and prevented from mixing with the water of the spring.

So far as the occurrence of mineral water is concerned, Bath certainly holds the first place among British health resorts, and even when compared with continental spas the hot springs of Bath form one of the most interesting and important instances of the long continued and abundant discharge of water having a high temperature and containing a considerable amount of dissolved mineral contents. It is not surprising therefore that the Romans, who had such a high opinion of the utility of baths, should have seized upon the opportunity afforded by the hot springs in the pleasant valley of the Avon for erecting bathing establishments on a scale of grandeur and magnificence which probably bore comparison with those of ancient Rome, or of Herculaneum and Pompeii. No doubt these hot springs had previously been used for bathing, but it is from the period of the Roman occupation of Britain that the history of Bath as a health resort may be said to commence. The former presence of the Romans in and around the present city is indicated by many remarkable remains which have from time to time been found and preserved, and though the existence of the Roman Baths had been lost sight of for ages after their partial destruction during the dark ages of the Saxon Conquest, there is historical evidence that baths were built in 1106 for the convenience of the Benedictine Monastery which had been erected over the forgotten ruins. From that time these baths were in the hands of the priors and monks until the dissolution of religious houses by Henry VIII., and it appears that the water of the hot springs was used for curative purposes as far back as the year 1138, when the Bishop of Bath and Wells founded a hospital for lepers and attached to it a bath called the Lazour's Bath, supplied with water from the hot spring. Probably the use of the water for such purposes had some connection with the common practice of medicine by ecclesiastics at that time; but in any case the bathing was under the jurisdiction of the ecclesiastical authorities, for in 1449 Bishop Beckyngton made a regulation that proper clothing should be worn by the bathers under pain of fine and excommunication. Harrison's account of Bath in 1578 describes the King's bath as having been "verie faire and large, compassed about with a verie high stone wall and two and thirtie arches for men and women to stand in separatlie." Mention is also made of the number of physicians then in daily attendance to advise those who intended to use the baths. At a later period the celebrity of the Bath water for curative purposes was sufficient to attract many visitors, and among them royal personages. Queen Elizabeth visited the city in 1599, and granted a charter to the civic authorities empowering them to undertake the care and administration of the baths. This duty does not appear to have been very zealously performed, for even in 1631 Dr. Jorden regretted that he could not recommend the internal use of the water, as it could not be procured "clear enough for drinking." He also added, in speaking of the city, "The streets are dunghills, slaughter-houses and pigstys. The butchers dress the meat at their own doors, while pigs wallow in the mire. The baths are bear gardens, where both sexes bathe promiscuously, while the passers by pelt them with dead dogs, cats and pigs." In Leland's description of Bath in 1538, he says, "There be two springes of whote wather in the west-south-west part of the towne, whereof the bigger is caullid the *Crosse Bath* because it hath a cross erectid in the middle of it. This bath is much frequented, and is temperate and pleasant, having 11 or 12 arches of stone for menne to stonde under yn tyme of reyne."

Bath was a favourite resort of the Earl of Leicester, and in a recent publication by the Historical Manuscripts Commission of papers preserved at Hatfield House, there is a letter dated 1577, from the Earl to Lord Burghley, in which he commends the Bath water as likely to be good for Burghley, if he did not keep too much company and use too liberal diet as he had done on a former occasion. At that time visitors to Bath were accommodated at the Abbey House or King's Lodgings adjoining the Baths, or at some other house kept by a physician, and the Earl of Leicester, speaking probably of one of these establishments, says, "The house is so little as a few fills it and hard then to keep sweet." The accommodation was no doubt meagre in the extreme even at the close of the seventeenth century, to judge from the account of a writer of that time, referred to by Macaulay, who says that "In his younger days the gentlemen who visited the springs slept in rooms hardly as good as the garrets which he lived to see occupied by footmen. The floors of the dining

rooms were uncarpeted and were coloured brown with a wash made of soot and small beer in order to hide the dirt. Not a wainscot was painted. Not a hearth or a chimney-piece was of marble. A slab of common free-stone and fire-irons which had cost from three to four shillings were thought sufficient for any fire-place. The best apartments were hung with coarse woollen stuff and were furnished with rush-bottomed chairs." These drawbacks do not seem however to have neutralized the attraction of the Bath water as a remedial agent and the repute of the city as a health resort increased notwithstanding.

Bath was visited in 1644 by Queen Henrietta, the wife of Charles I., and in 1663 Charles II. took Queen Catherine to Bath, for the benefit of the water. In 1702 Queen Anne, with her consort, Prince George, visited Bath, and about that time a pump room was erected under the auspices of Beau Nash. This building was enlarged in 1751, and after several improvements was replaced in 1796 by the present structure. On its pediment is inscribed in gilt letters the motto from Pindar, ΑΡΙΣΤΟΝ ΜΕΝ ΥΔΩΡ, of which Sir William Boyd has given the following paraphrase :—

" Chief of Nature's works divine,
Water claims the highest praise."

About the period now referred to the remains of the old Roman buildings connected with the use of the hot water were discovered at a depth of several feet below the surface. They were situated in the position at present occupied by the Kingston buildings and baths near the Abbey, and some idea may be formed of their extent from the fact that they occupied an area measuring 240 feet from east to west, and 120 feet from north to south, being also highly decorated with tesselated pavements, columns, pilasters, and every ornament of classical architecture. At the time it was conjectured that these baths were merely one wing of a larger building, and on further exploration in 1799, 1803 and 1871, this was found to be the case. Latterly these old Roman baths have been excavated, and they present a memorial of the past of great interest and importance.

The baths themselves, owing to the far-seeing and liberal expenditure sanctioned by the municipal authorities, are as complete as any in Europe and are well worth seeing. All the modern appliances in the way of douches, etc., have been adopted, and the yearly increasing and very considerable number of bathers bears ample testimony to the value of the waters and the esteem in which they are held.

There are in Bath several hospitals, the records of which show that from the earliest periods provision was made for poor strangers resorting to the mineral springs. The oldest of these institutions were the already mentioned Lepers' Hospital, which was destroyed in 1786, St. John's Hospital, founded and endowed in 1174 by Bishop Fitzjocelyn, Bellot's Hospital, founded in the year 1609, by the steward of Queen Elizabeth's household, and the Mineral Water Hospital, established in 1742, since which time many thousands of patients have been admitted and either cured or greatly relieved. The Royal United Hospital was erected in 1826 and has been recently enlarged.

Bath is pre-eminently distinguished for the variety and beauty of its suburban walks, presenting an almost endless succession of delightful prospects.

PROXIMATE ANALYSIS OF SAXIFRAGA LIGULATA.

BY DAVID HOOPER, F.C.S., F.I.C.

The habitat of the Indian Saxifrages is mostly confined to the northern and mountainous parts of the peninsula, as the Himalayan ranges from Bhutan to Kashmir, at elevations of 7–10,000 feet and the Khasia Hills. *Saxifraga ligulata*, Wall., grows abundantly in the Punjab Himalayas, and the rhizome, or officinal part of the plant, is sent down to the plains and sold in the bazaars of the North West Provinces and Bengal. Dr. J. L. Stewart in "Punjaub Plants" gives the little information we possess about this drug. He says, "The root is bruised and applied to boils and ophthalmia in some places where the plant grows. It is reckoned absorbent, and is given in dysentery and cough. The bazaar names are Pakhánber Jintiana, and Maslún."

An authentic sample of the drug has been supplied me for chemical examination by Dr. Dymock of Bombay. It occurs in pieces 1 to 2 inches long, and about half to 1 inch in diameter. The external surface is brown, wrinkled and scaly, and bears numerous scars, rootlets and circular markings. The substance is dense and hard, with a reddish colour. The rhizome appears to have been cut up before drying. The red colour of the sections is evidently developed by age, as a fresh cut shows the interior to be much lighter, or almost white. Under the microscope there were seen numerous conglomerate crystals and ovoid starch cells. The taste is slightly astringent, and the odour is similar to that of tar, but more aromatic.

The ethereal extract of the finely-powdered rhizome was of a pale brown colour, somewhat crystalline, and contained the peculiar odorous principle of the drug. The aqueous solution of this extract gave inky mixtures with ferric and ferrous salts, and precipitated gelatin solution. The mixture of tannic and gallic acids was shaken up in solution with pure ether, and the supernatant liquor afforded the gallic acid in a pure condition, known by its reactions with strong sulphuric acid and alkalies, and by mixing clear with gelatine. Alcohol removed from the residue of this extract an odorous body of soft fatty consistence, and the remainder of the extract was a wax, melting about 48° C. The wax was insoluble in cold alcohol, but almost entirely dissolved on boiling, separating into a mass of crystalline plates when cooled, not wholly dissolved after prolonged boiling with alcoholic potash, not soluble in cold or hot sulphuric acid ; in the latter it first turned red, then melted and blackened ; nitric acid decomposed it into a yellow brittle resin.

The alcoholic extract of the powdered drug contained a large quantity of a tannic acid, with some uncrystallizable sugar. The tannic acid was soluble in hot water and reprecipitated on cooling ; its insolubility was prevented by adding ammonia until the cold solution was neutral ; neutral plumbic acetate then removed the whole in the form of a reddish-brown sediment. The acid gave a blue-black solution with ferric salts, a precipitate with gelatine, and showed evidence of its glucosidal nature. The acid was very similar to the gallo-tannic acid of oak-galls. The resemblance is very close when comparing their lead salts : gallo-tannic acid leaves 50·00 per cent. of lead oxide, the tannic

acid under examination left 50·45 per cent. of oxide as the mean of two fairly concordant estimations.

The filtrate from the lead precipitate, after treatment with hydrogen sulphide, was composed entirely of a sugar readily reducing Fehling's solution. No alkaloids or mineral salts were detected.

The aqueous extract contained gum, tannic acid, sugar and a small amount of inorganic salts.

The treatment of the residual powder with a one per cent. soda solution dissolved out some red colouring material and metarabin. On adding acetic acid to the solution, it at once pectinized; this effect was produced also when ferric chloride, iodine in potassium iodide, and sulphuric and hydrochloric acids were added. This pectinization was very remarkable. As it would have required an enormous amount of spirit to cause the precipitate to separate, its estimation would have been attended by a great loss. In the following table, the metarabin, albumen, etc., is the loss on the powdered drug sustained in exhausting it with diluted soda. After prolonged boiling with acid previous to the treatment with soda, the pectinization of the metarabin did not take place when made neutral with acid.

The calcium oxalate was dissolved out by means of five per cent. hydrochloric acid. This salt was in the plant in the form of conglomerate raphides, and its reduction to the form of carbonate when the plant was burnt constituted the major portion of the ash, which amounted to 12·87 per cent.

The starch was estimated by conversion into glucose by boiling it with a 1 per cent. hydrochloric acid solution for four hours, and titrating the resulting liquor with Fehling's copper tartrate solution.

The following table gives the quantity of the different constituents of the rhizome of *Saxifraga ligulata* as far as they were identified in the foregoing analysis:—

Wax and odorous principle	·92
Gallic acid	1·17
Tannic acid	14·28
Glucose	5·60
Mucilage	2·78
Metarabin, albumen, etc.	7·85
Starch	19·00
Calcium oxalate	11·61
Mineral salts	3·80
Sand	·58
Crude filtre	20·80
Moisture and loss	11·61
	100·00

The plants of the natural order Saxifragaceæ have been very little examined chemically, but they are usually regarded, according to some text books, as being astringent. The root of *Heuchera americana*, official in the old United States Pharmacopœia, is a powerful astringent, and is called on this account alum root. On the other hand the root of *Dichroa febrifuga* does not possess this property, and no tannic matters have been found in it. Some allied plants, the hydrangeas, for instance, do not contain an astringent property. The root of *Polygonum Bistorta* contains some of the same constituents as those found in *Saxifraga ligulata*, a circumstance of some importance to the native druggists, as the bazaar name of the latter, *mazlún*, is applied equally to the Bistort root, and Dr. Stewart informs us that the one is often sold for the other.

THE ACTION OF LIGHT ON WATER COLOURS.

BY DR. W. J. RUSSELL, F.R.S., AND CAPTAIN ABNEY, F.R.S.

In April, 1886, the Lords of the Committee of Council on Education requested Dr. W. J. Russell and Captain Abney to carry out an exhaustive series of experiments on the action of light on water-colour drawings. Subsequently, at the request of the Royal Society of Painters in Water Colours, a representative committee of artists was appointed with whom those gentlemen were invited to confer upon the subject. A first report, dealing with the physical effects of light on water colours, has just been issued as a blue-book, from which the following extracts are taken. The investigation into the nature of the chemical changes involved is to form the subject of a future report.

Introduction.—An investigation of the cause of the fading of colours naturally divides itself into at least three parts. First, the nature of the optical changes; second, the nature of the chemical changes; and third, the causes which initiate and accelerate these changes. To carry out such an investigation necessarily requires much time; many of the changes, more especially the chemical ones, can only be brought about by brilliant sunlight, acting for a considerable length of time. The report is therefore divided into two sections, the first of which is now presented, dealing especially with the nature of the optical changes.

Before giving results it is thought advisable to make a few preliminary remarks on the optical properties of pigments and the different characters of light to which they may be exposed. Colours are popularly talked of as greens, blues, reds, etc., and to these distinctive appellations are added by artists. Thus they talk of emerald green, cobalt blue, Venetian red, etc. Though to some extent to the trained eye an idea is thus given of the hue and luminosity of the colour, yet to the scientific experimentalist the definitions of colours require supplementing, and in estimating any change which may take place in them an exact quantitative value of each is a desideratum. As to why a pigment is coloured, science has hitherto not furnished a satisfactory answer, nor for the inquiry undertaken is it at all necessary that an answer should be given. The question, however, as to how a pigment produces the impression of colour is one which can be answered. Colour is due to the selective action of the pigment, or stain, on light. That is to say, the rays of certain wave lengths (or colours) are transmitted and reflected by each pigment, or stain, in a more or less perfect manner and the others are absorbed. The transmitted and reflected rays will be shown to be identical—except in certain cases which it is unnecessary to consider here—and it is to these that the colour of the pigment is due.

If a thin slice of white light be decomposed into its component colours by means of a prism we get what is known as the spectrum, and if this variegated band be allowed to fall on a white surface, such as white card or a surface of zinc oxide or barium sulphate, that surface becomes luminous where the colours fall, and they are presented to the eye with the greatest brilliancy possible. If, however, for the white surface a surface covered with some coloured pigment be substituted, we at once perceive a difference. That which is generally supposed to be the colour of the pigment is lost, and we have a stripe of the surface illuminated with the different rays of the spectrum, but their different colours are presented to the eye with their brilliancy unequally reduced. Probably no one coloured ray is reflected with the same brilliancy as it was from the white surface, and a large part of the spectrum is very much dimmed. In other words, the pigment does not reflect any component of white light with the same intensity as does the white surface. If

by proper means the different coloured rays of the spectrum reflected from the coloured surface be collected and re-combined, we get back again the colour of the pigment. If the brightness of *each colour* reflected from the pigment be measured in terms of the brightness of the same colours reflected from white paper, we have a quantitative measure of the light reflected from the pigment, such light being that by which the pigment produces the impression of colour. Thus, if the light reflected from cobalt blue in the various parts of the spectrum be measured, we may produce the colour of cobalt on white paper by reducing in proper proportions the different rays of the spectrum formed by white light, and then re-combining them. The colour of a pigment, it may be said, is dependent on the amount of the components of white light which it reflects back to the eye.

Further, it will be seen that no matter what the source of light may be,—whether the yellowish-white light of gas, the purer white of the electric arc light or of the sun, or the bluer white light from the sky,—the comparative measures of the brightnesses of the different colours reflected from the two surfaces will always be the same. Thus, if the spectrum formed by gaslight be used, and the brightnesses of the different parts of the spectrum reflected from a white surface and from a coloured surface be compared, the comparative values of the different rays thus obtained will be the same as if the source of light had been the sun. To see what will be the colour of a pigment by gaslight, the rays of the spectrum of gaslight must be reduced in the proper proportion found for the particular pigment and be again re-combined, and this will give the colour of the pigment seen by gaslight. In the same way, if the spectrum be formed by sunlight, the different parts of that spectrum must be reduced in exactly the same proportion, and the re-combined spectrum will give the colour of the pigment as it would be seen in sunlight. Careful measurements of the various simple and mixed water colours which are usually employed by artists have been made and are given in an appendix to the report. The source of light employed was the electric arc light, and the relative intensities of the different coloured rays were measured by a method described in a paper recently read before the Royal Society.

The reporters then trace the sequence of phenomena which happen when white light falls on a coloured surface. Pigments may be divided into two classes, those which are insoluble and those which are soluble in water. Many of the soluble colouring matters are precipitated as lakes, and the same arguments hold good for these as for the solid pigments. In the case of an insoluble pigment a ray of white light falls on one of the particles, but only some components of the light can pass through it, and it emerges after its passage as coloured. This strikes the next particle and part is reflected back, reaching the eye as coloured light, but part penetrates through the next particle. This in its turn is partly reflected back, and partly transmitted, and so on. At the same time, however, a certain amount of white light is reflected from the surface of the particles and mixes with the coloured light which has passed through one or more particles. Hence the colour of a pigment always contains a certain percentage of white light, together with the coloured light. Thus a colour of Prussian blue is principally due to the transmission through the particles of a large proportion of the violet-blue and blue-green rays, together with a small quantity of white light reflected from the surface of the particles to which the original light falling on it had direct access. It may be remarked that when thin washes of these pigments are washed over white paper the number of coloured particles are comparatively few, and that the white paper reflects relatively more white light to the eye. A microscopic examination of such a surface reveals this fact in a very interesting manner. The colour is therefore less intense in hue and whiter. The nearest approach to the real colour of a water-colour pigment is seen when a mass of the moist pigment is on the palette, the white light reflected being then at its minimum. The same argument applies to those pigments which are soluble, and which, consequently, we may take to be continuous. The light which penetrates such a colour will be of the same hue as that reflected to the eye from the paper. The white light passes through the stain, loses certain portions of the original spectrum colours, is reflected from the white paper beneath, and is once more transmitted through the colour, reaching the eye as a coloured light. Thus the colour of the carmine (cochineal) is due to the transmission by the dye of most of the red and a good deal of the blue of the spectrum of white light. The effect of mixing a white with a coloured pigment is to cause more white light to be reflected, and thus to give a pale and less transparent appearance to the colour.

It is of interest to compare the light reflected from colours with that transmitted by them. In the Prussian blue the reflected and transmitted light are very nearly identical, but in the carmine the transmitted light is less than the reflected. The small difference in the first case and the larger difference in the second is due to the fact that the depth of colour in the reflected and transmitted lights is not equal.

In the analysis of white light by the prism mention has been made so far only of those radiations which are visible, and which are called "light." These have been considered first, as it is these alone from which a pigment derives its colour. But there are other radiations which co-exist with the visible radiations, and though invisible to the eye may have to be taken into account. Of these invisible radiations some lie beyond, or, as it is generally termed, below the red in the spectrum, and some beyond, or above the violet. Those which are below the red, and have a longer wave length, experiment has shown to possess more energy or capacity of doing work than all the radiation ("light") above the red. What that work may be will be touched upon briefly later on. It would be beyond the scope of this introduction to show how the comparative energies of the radiations, visible and invisible, forming the spectrum can be measured. It will suffice to say that by allowing the different parts of the spectrum (light and dark) to fall on an undecomposable substance (lamp black) which can absorb them all (or very nearly all), the measurement by thermo-electric means of the rise in temperature of the lamp black produced by the different parts of the spectrum gives a comparative measure of the energy of radiation of these parts. It must be remembered that the energy of the slice of white light decomposed by the prism, and which includes the invisible radiations, is the sum of all the energies of the different radiations of the spectrum.

A comparison of the energy curve of the electric (arc) light of the visible part of the spectrum with its luminosity curve shows that the brightness of the visible spectrum bears no sort of relation to its energy. The brightest part of the visible spectrum is in the yellow; whilst the point of maximum energy is just below the red.

The dark rays, when falling on a pigment, behave in exactly the same manner as those which are visible; some disappear, and others are transmitted, and though they give no colour to the pigment, since it would appear of the same colour if they were excluded, they are just as much in the reflected light as those rays which are visible. It has been stated that the light which is transmitted through a pigment is of the same genera

character as that reflected, and the same holds good for the dark rays.

The energy existing in the invisible region beyond the violet is very small, but since all radiation consists of a wave motion in what physicists have called the ether, it may happen, and does indeed happen, that the wave period of this portion of the spectrum is of such a nature as to cause a destructive vibratory motion on the atoms of the molecules of the pigment on which the light falls. It is necessary, therefore, to take this action into consideration.

We are now in a position to see that all radiation, visible and invisible, is not reflected or transmitted through the various pigments, and the question arises as to what has become of the rays which are apparently lost. The radiation which is not reflected from the colouring matter has disappeared in passing through it; in other words, the pigment has absorbed certain of the radiations, visible and invisible, and with very close approximation to the truth, it may be said that the rays absorbed are complementary to those reflected. Hence in Prussian blue the rays absorbed are principally in the dark part of the spectrum, and in the red and yellow, and partly, but in a minor degree, in the green, blue and violet. Similarly in carmine, the rays absorbed are principally in the dark part, the yellow and the green, of the spectrum, and less in the blue and violet of the spectrum.

Now it is a received axiom in physical science that in any body which absorbs radiation the energy so disappearing performs work of some kind in that body. The work so done is a raising the temperature of the body, a chemical decomposition of the body, or a rearrangement of its molecular condition, as for instance in the iodide of mercury. Each kind of work may be done at the same time, but the energy which is expended on one form cannot be again expended on another form of work. On elements such as carbon, gold, etc., the work done only raises the temperature of the body above that of the surrounding objects, but in chemical compounds, such as nearly all the pigments in use are, there may be besides a chemical decomposition. The chemical decomposition of a colour means a fading or an alteration in its colour; but the raising of its temperature to the small degree which the visible (light), or invisible, radiation to which it is ordinarily exposed can effect, does not alter its composition or colour. That the temperature above that of the surrounding objects to which a colour can be raised, even by sunlight, when *freely exposed*, is small is not only shown by theoretical reasoning, but by direct experiment. In the case of a wash of water-colour, the particles on which the radiation falls are very small, and they consequently have a large surface compared with their volume. As the rapidity of loss of temperature in equal volumes under the same conditions is in the ratio of the radiating area, it follows that the loss of temperature by radiation in the small mass is very nearly equal to its gain. In other words, there is an equilibrium of temperature established which is but very little higher than the temperature of surrounding objects. When chemical decomposition takes place by light, however, the results are different. The decomposition once effected remains, and the quantity of the matter decomposed increases with the length of exposure. The outside of the particles is first acted upon, and then gradually (as light continues to act) the inner portions are decomposed, until finally the whole particle is changed. Evidently those colours, the effect of light on which is to bleach them, are the most rapidly acted upon. Again, too, the large area of the surface of particles, as in a water-colour, compared with their small volume, is favourable for the rapid effect of the action of light in altering their composition.

(*To be continued.*)

THE LOCO WEED (CRAZY WEED).*

(*Astragalus molissimus. N. O. Leguminosæ.*)

BY JAMES KENNEDY, PH. G.

No other plant in the Flora of Texas has enjoyed greater notoriety than the famous "Loco."

Popular superstition has accredited it with a most remarkable property—viz., the power of producing insanity—which, if true, would make it one of the most wonderful creations of the vegetable kingdom.

So implicit has been the belief in the power of this plant to derange the mental faculties that the victims of this superstition (originally Mexicans, no doubt), with exquisite appropriateness (according to their belief) christened it "Herba Loco," which in English means "insane herb." It is said that when senora no longer loves her liege lord senor and fain would rid herself of him, she procures some Herba Loco, prepares a decoction of it, and beguiles his innocence into imbibing it, after which he becomes permanently insane or else dies in a short time.

The extravagant "yarns" which I had heard of the Loco induced me to investigate the properties of this remarkable plant, and determine what physiological phenomena result from its action.

The accompanying cut represents a rather fine specimen of the plant Loco. It was taken from a plant which reached me in fine condition and just ready to blossom. The flowering stalk which was taken from another plant has been magnified to twice its natural size.

The botanical characters of the Loco are briefly as follows:

An herbaceous perennial from 8 to 12 inches in height. Its numerous branches being closely crowded upon exceedingly short, decumbent stems. The leaves are compound (oddly pinnate) alternate, with long and pointed stipules. The leaflets are elliptical, with entire margin, pubescent, and less than 1 inch in length.

Inflorescence.—The flowers, which are of a purplish colour, are sessile upon a common peduncle of considerable length. The peduncles are rather large, and arise from the axils of the leaves, calyx 5-toothed, inferior. Corolla papillionaceous, long and narrow. Stamens, 10 diadelphous (9 and 1); pistil, 1; ovary, 1; 2-celled; ovules numerous. At the base of each flower is a small bract.

Chemical examination.—The green plant loses about 80 per cent. of its weight in drying.

The dried and powdered drug yielded to cold water 30·6 per cent. The extract consisting of mineral salts (magnes. sulphate and sodic chloride principally), a peculiar organic acid, tannic acid, gum, colouring matter and extractive. The residue treated with alcohol yielded 1·7 per cent. of extract, consisting of resin and chlorophyll.

The ether extract amounted to 0·9 per cent., consisting of a green colouring matter and a resin insoluble in alcohol.

Both the alcohol soluble and the ether soluble resins are dissolved by potassium hydrate, forming a transparent green solution, from which the resin may be precipitated by addition of hydrochloric acid.

On distillation with water a slightly turbid distillate was obtained, possessing a peculiar rank odour due to a trace of volatile oil.

Distillation with potassium hydrate yielded a distillate of feebly alkaline reaction (the alkalinity being due to ammonia), and containing traces of the peculiar organic acid already mentioned.

The distillate obtained with sulphuric acid (properly diluted) was of pronounced acid reaction, and by careful evaporation on water-bath an amorphous resi-

* Read at the meeting of the Texas State Pharmaceutical Association. Reprinted from the *Pharmaceutical Record*, July.

due of acid character was obtained, of which we shall have more to say presently,

Analysis of the ash.—The dried plant on ignition yielded 20 per cent. of ash, consisting of magnesium sulphate, sodium chloride, alumina, silica, iron a trace.

The peculiar organic acid.—An infusion of the drug from which the colouring matter had been removed by treatment with plumbic oxide and the lead removed with sulphuretted hydrogen, gave precipitates with iodine, potassium iodohydrargyrate, alkaline carbonates, and, after standing some time, with phosphomolybdic acid.

Similar reactions were produced with a hydrochloric solution of the extract yielded to alcohol by a portion of the drug that had been previously heated with milk of lime.

These reactions induced the belief that an alkaloid was present, but the most rigorous methods for the separation of alkaloidal principles failed to remove the substance producing them. (The abundant precipitate produced by the alkaline hydrates, potassium, sodium and ammonium, was found to consist of magnesium hydrate, an abundance of this base being present in the plant.)

Boiling the infusion with concentrated hydrochloric or sulphuric acids in excess causes a separation of this principle, but, owing to its volatility, it cannot be obtained for examination in this way.

In testing for sugar I found the infusion to exert a strong reducing influence on copper salts, producing,

with Fehling's solution, a copious yellow principle of cuprous oxide. In repeating the experiment with another portion of the infusion that had been previously treated with sodium carbonate no reduction of the copper salt occurred, which showed that the principal reducing copper salts had been removed by the treatment with sodium carbonate, and consequently not glucose; but, as I afterward discovered, the reaction with Fehling's solution was due to the organic acid. This body precipitates with the alkaline carbonates, and the precipitate is re-dissolved by an excess of the reagent.

The acid distillate obtained by distilling the drug with sulphuric acid was found to contain the principle producing the singular reaction already referred to. I have succeeded in separating it only in minute quantities, the distillate obtained being a very dilute solution of this substance. The following properties were determined: An amorphous substance of faintly yellow colour (as obtained from the solution by cautious evaporation). Its aqueous solution reddens litmus. Almost insoluble in alcohol.

The aqueous solution heated with iodine solution assumes a yellow to brown colour according to the amount added, producing a peculiar wavy appearance of the fluid, with metallic lustre, subsiding in a moment to a bronze-like column; on agitation, again assuming the ring-like or wavy appearance (which is extremely characteristic). On standing for some time a bright, ustrous precipitate is deposited, which on microscopic examination is found to consist of acicular crystals of faintly yellow colour, adhering in fan-like tufts. With potassium iodohydrargyrate, potassium iodide and ammonium iodide, similar reactions occur, the iodine being evidently the only element engaged in the reaction with this acid. With plumbic subacetate a slight precipitate occurs. No reaction occurs with neutral plumbic acetate.

Silver nitrate is slightly darkened by boiling with it.

A yellow precipitate with chromic acid, also with potassium bichromate; a pronounced turbidity with calcium chloride, soluble in excess of either reagent or acid.

No precipitate with barium or magnesium salts.

A bluish-white precipitate with sodium carbonate, and a white one with potassium carbonate, both soluble in excess; in contact with potassium hydrate for some time the solution assumes a bright yellow colour.

A powerful reducent of copper salts. This substance may be detected with Fehling's solution even when no reaction is perceptible with other reagents.

Physiological Properties.—Notwithstanding its notoriety, the history of the plant has remained very obscure indeed, and inquiries addressed to persons pretending to be familiar with the plant and its effects on animals elicited replies at great variance with each other, making the information obtained of doubtful value, as subsequent investigations substantially proved.

Some asserted that the plant is eaten by horses and cattle, but not by mules. Others declared that it is

eaten by cattle only, and that horses will not touch it. While others again state that it is eaten by horses, cattle and mules.

With reference to its toxic properties, some say the fruit alone is poisonous; others that the poisonous effect is due to an insect infesting the flowers; still others, who say that the leaves only are poisonous; while there is a majority agreeing with neither of the above, who pronounce all parts of the plant above ground poisonous, and at all stages of its growth.

Its effects on animals have been differently described by different observers. By one class we have described the symptoms of a functional disturbance of the organs of assimilation, resulting in a gradual wasting away of the animal, ending in death at the expiration of several days, weeks, or sometimes months, but meanwhile the animal is observed to become "foolish."

By others we are furnished with the symptoms of violent colic, beginning with a very mild stupor and ending in violent delirium, the animal usually causing its own death by its violent antics.

Enormous distension of the abdomen is claimed by some as an invariable effect of the loco, and the distension is said to be relieved by a knife thrust or pistol shot, through its walls, which furnishes an exit for the accumulated gas and insures the recovery (?) of the animal.

Dr. B. F. Kingsley, of this city (San Antonio), gives an interesting account of the death of some mules feeding upon it. The symptoms, manner of death and post-mortem examination are all described in Daniel's Texas *Medical Journal*, June, '88. I must here acknowledge the doctor's kind assistance in our experiments upon the dog to determine its physiological action.

I must also acknowledge the kindness of Mr. Geo. E. Geege, of Fort Davis, who furnished me the plants for investigation.

1. A half-ounce of the green plant was thoroughly bruised and infused with 10 parts of boiling water for an hour. The infusion, which was of a rank nauseating odour and taste was adminstered to a dog fasting (weight 23 pounds). No effect was produced even after several hours (12).

2. A decoction was made by boiling 1 part of the green plant (bruised) with 10 parts of water, for one hour. The decoction representing 1 ounce of the plant was administered, but without producing any effect whatever.

3. Thinking perhaps the gastric juice on account of its acidity might exercise a greater solvent influence on the poisonous (?) principle than water, I made a decoction acidulated with hydrochloric acid. After neutralizing the acid, the decoction was adminstered, but produced no untoward effect.

4. A decoction representing 4 ounces of the dry drug (equal to 20 ounces green) was also adminstered without any unpleasant effect.

5. Four hundred grams of the drug in substance, previously dried and reduced to powder, was administered, the only effect, if any, being an increased appetite.

6. Finally the organic acid obtained from 4 ounces of the drug was adminstered to the dog but without any observable effect.

Our experiments were conducted upon the dog because horses and cattle were not to us available subjects, and we believe they have demonstrated conclusively the non-toxic or innocuous character of the drug. If death is produced by the plant at all it is not dependent on any poisonous principle contained therein, but is perhaps due to the tough, fibrous and "indigestible" character of the plant acting as a foreign body, producing irritation and symptoms consequent thereupon, or else its action is identical with an overload of green food of any kind.

As the observations heretofore reported were all upon animals feeding in pastures, there seems to be no positive evidence that "loco" has ever caused the death of any animal, and the immense destruction of stock with which it is charged may have been caused by some poisonous plant heretofore unsuspected. Our conclusions, therefore, are that the "loco" (*Astragalus molissimus*) is non-poisonous, and does not possess any of the properties ascribed to it by popular superstition.

PRODUCTION OF CAVIAR IN RUSSIA.*

Caviar, which is derived from the eggs of the sturgeon (*Accipenser huso*), is an article of considerable importance in the export trade of many Russian towns and of Astrakhan, a large trade being carried on, on the Caspian Sea, the Volga, and its affluents. The *Journal de la Chambre de Commerce de Constantinople* says that from 30,000 to 40,000 pouds (the poud being equivalent to thirty-six pounds avoirdupois) are annually exported from South Russia, principally from Taganrog. The greater part finds its way to Turkey, Greece, and certain parts of Italy and Germany. But little is sent to England, and still less to France. The following is the method employed in taking the sturgeon on the Volga. The fisheries are situated at the mouth of the river, and in the rear on the land are erected large warehouses, or caves dug in the soil, and troughs extend from one end to the other to contain the strong brine necessary for the preparation of the caviar. Fishing operations are usually conducted in the spring, autumn, or winter. The autumn fisheries are considered the best, because they produce a greater supply of eggs. In the winter season the Russian fishermen fish for the sturgeon with a harpoon, a large hole being cut in the ice. During the other fishing seasons on the Volga nets are used, these consisting of a large engine composed of cables about a hundred metres long, to which are attached cords furnished with fish-hooks. These cables, fastened one to the other, are fixed at the bottom of the stream by anchors, and kept in place by beams. Each hook is calculated to be able to sustain the weight of a fish three or four metres long, and this method of fishing is very productive. Each fishing establishment is provided with boats of different dimensions. As soon as the fish are taken they are placed on board, and then transported to one of the larger vessels accompanying the fishing fleet, where they are laid down and covered with salt. All the vacant spaces between the troughs are furnished both in spring and autumn with large quantities of ice to keep the temperature fresh. After having split the head of the fish with a hatchet it is then cleaned, the belly is opened as far as the tail, and the eggs, the entrails, bladder, and dorsal nerve, called *vesiga*, which is made by the Russians into pies, and considered a great delicacy by them, are removed. All these operations last about a quarter of an hour. Before the fish ceases to writhe the eggs are made into fresh caviar, which, not being intended for exportation, is generally consumed soon afterwards. Caviar is prepared in two ways, differing very slightly from each other. For export, caviar *grénu* and caviar *compact* are prepared, and the following are the methods of preparation. In making caviar *grénu* the eggs are cleaned in water to remove the outer covering, and are then left in strong brine for about three-quarters of an hour. They are then drained in sieves placed on a kind of large inclined trench, which lets off the water into a basin. As regards caviar *compact* the method of preparation is almost the same. After having separated the eggs from the skin and the veins, the piles of eggs are salted in the troughs, and are left about three-quarters of an hour in the brine, and while there they are kneaded in order to soften them, after which, instead

* From the *Journal of the Society of Arts*, August 3.

of being allowed to drain off at leisure, they are twisted in cloth bags. Thus prepared, the caviar is heaped lightly in small wooden barrels, and is ready for delivery. A third method of preparing caviar consists in preserving the eggs just as they are taken from the fish, and after lying for seven or eight months in brine they are dried in the sun. This is the coarser kind of caviar, which, however, is very largely exported. Other substances are also extracted from the sturgeon in which a large trade is carried on. In addition to the eggs, another important product, from an industrial point of view, is the swimming bladder, situated above the dorsal spike of the sturgeon. These organs, plunged in water and separated from their external skins, cut lengthways, covered with cloth, softened by the action of the hands, made up into tablets or small rolls, constitute almost the whole of the isinglass which is consumed in Europe, and which is known under the name of *ichthyocol*. Mixed with glue this product is of great adhesive power, and is used for uniting broken glass and porcelain. The fat of sturgeons when it is fresh is used as a substitute for oil and butter, and is largely consumed by the inhabitants of the southern districts of Russia, while the skin is used as leather, and in some cases the skin of the young fish, when it is thoroughly cleaned and well dried, is a substitute for window glass in parts of Russia and of Tartary.

SELECTIONS FROM THE NATIONAL FORMULARY

Issued under the auspices of the American Pharmaceutical Association.

(*Concluded from page* 108.)

Spiritus Curassao.

Spirit of Curaçao.

Oil of Curaçao Orange. . .	2 fluid ounces.
Oil of Fennel.	15 minims.
Oil of Bitter Almond	3 minims.
Deodorized Alcohol. . . .	10 fluid ounces.

Mix the Oils with the Deodorized Alcohol, and keep the Spirit in completely filled and well-corked bottles, and stored in a cool and dark place.

Note.—The essential oils used in this case must be as fresh as possible, and *absolutely free* from any terebinthinate odour or taste. Oil of Curaçao Orange may be obtained without difficulty in the market, but it should be carefully examined as to its quality, immediately upon receipt, and should not be kept in stock, for any length of time, without special precautions. A still finer quality of Oil of Orange is that derived from Citrus nobilis, which is known in the market as Oil of Mandarin.

Tinctura Amara.

Bitter Tincture. Stomachic Tincture. Bitter Stomachic Drops. Stomach Drops.

Gentian	384 grains.
Centaury, herb.	384 „
Bitter Orange Peel . . .	256 „
Orange Berries.	128 „
Zedoary, root	128 „
Alcohol,	
Water, each.	enough to make 16 fluid ounces.

Reduce the drugs to a moderately coarse (No. 40) powder, and percolate it, in the usual manner, with a mixture of *two* (2) *volumes* of Alcohol and *one* (1) *volume* of Water, until *sixteen* (16) *fluid ounces* of percolate are obtained.

Note.—Centaury is the herb of *Erythræa Centaurium* Persoon. Orange Berries are the unripe fruit of *Citrus vulgaris* Risso, collected while small. Zedoary is the rhizome of *Curcuma Zedoaria* Roscoe. The product obtained by the above formula is practically identical with that which is officinal in the Germ. Pharm.

Tinctura Cinchonæ Detannata.

Detannated Tincture of Cinchona.

Fluid Extract of Cinchona (U.S.P.)	3 fluid ounces.
Alcohol	8 „ „
Solution of Tersulphate of Iron.	6 „ „
Water of Ammonia	6 „ „
Water,	
Diluted Alcohol, each.	a sufficient quantity.

To the Water of Ammonia, diluted with *twenty-four* (24) *fluid ounces* of Water, gradually add the Solution of Tersulphate of Iron, previously diluted with *forty* (40) *fluid ounces* of Water, under constant stirring. Pour this mixture, containing Ferric Hydrate as a precipitate, upon a wet muslin strainer (which has been tared, after having been wetted and deprived of the excess of water by moderate pressure), and when the liquid has drained off, return the precipitate to the vessel, and mix it intimately with about *sixty-four* (64) *fluid ounces* of Water. Again drain it on the strainer, transfer it once more to the vessel, and treat it as before. Finally drain and press the precipitate on the strainer until it weighs *eight* (8) *troy ounces*.

Mix the Fluid Extract of Cinchona with *eight* (8) *fluid ounces* of Alcohol, and add the Ferric Hydrate previously prepared. Agitate the mixture frequently, until the tincture is deprived of tannin, which may be known by the absence of a blackish-green colour when a small portion of the clear tincture is treated with a drop or two of tincture of chloride of iron. Insert a plug of absorbent cotton into a suitable percolator, and introduce the mixture. As soon as the liquid has disappeared from the surface, pour on enough Diluted Alcohol to make the product measure *sixteen* (16) *fluid ounces*.

Note.—This preparation is practically identical, in strength of Cinchona (without the tannin), with the officinal *Tinctura Cinchonæ*.

Tinctura Ferri Citro-Chloridi.

Tincture of Citro-Chloride of Iron. Tasteless Tincture of Chloride of Iron. Tasteless Tincture of Iron.

Solution of Chloride of Iron (U. S. P.).	4 fluid ounces.
Citrate of Sodium	7 troy ounces.
Alcohol	2½ fluid ounces.
Water . .	enough to make 16 fluid ounces.

Mix the Solution of Chloride of Iron with *four* (4) *fluid ounces* of Water, and dissolve in this mixture the Citrate of Sodium with the aid of a gentle heat. Then add the Alcohol, and when the solution has become cold, make up the volume with water to *sixteen* (16) *fluid ounces*. Set the product aside in a cold place for a few days, if convenient, so that the excess of saline matter may separate. Then filter, and pass enough cold Water through the filter to restore the original volume.

Each fluid drachm contains an amount of Iron equivalent to about 7½ grains of dry Chloride of Iron (ferric).

Note.—This preparation is practically identical in the strength of iron, but not in the quantity of alcohol, with the officinal *Tinctura Ferri Chloridi*.

Tinctura Tolutana Solubilis.

Soluble Tincture of Tolu.

Balsam of Tolu.	1½ troy ounces.
Carbonate of Magnesium .	60 grains.
Glycerin	6 fluid ounces.
Water,	
Alcohol, each .	enough to make 16 fluid ounces.

Mix *three* (3) *fluid ounces* of Alcohol with the Glycerin, and dissolve the Balsam of Tolu in the mixture with the aid of heat, avoiding loss by evaporation. Next add *six* (6) *fluid ounces* of Water, and allow the mixture to become cold. Pour off the milky liquid

from the resinous precipitate (which latter is to be rejected), mix it with the Carbonate of Magnesium by trituration and filter. Lastly, pass enough of a mixture of *one* (1) *volume* of Alcohol and *two* (2) *volumes* of Water through the filter, to make the whole filtrate measure *sixteen* (16) *fluid ounces.*

Note.—This preparation may be added to Syrup or Water without producing cloudiness. A mixture of 1 fluid ounce of this preparation with 15 fluid ounces of Syrup yields a product which may be used as Syrup of Tolu in all cases where the officinal preparation is not required.

Tinctura Vanillini Composita.

Compound Tincture of Vanillin. Compound Essence of Vanillin.

Vanillin	45 grains.
Cumarin	3 ,,
Alcohol	3 fluid ounces.
Glycerin	2 ,,
Syrup	2 ,,
Compound Tincture of Cudbear (N. F.)	120 minims.
Water . . .enough to make	16 fluid ounces.

Dissolve the Vanillin and Cumarin in the Alcohol, add the Glycerin, Syrup, and Compound Tincture of Cudbear, and lastly, enough Water to make *sixteen* (16) *fluid ounces.*

Unguentum Sulphuris Compositum.

Compound Sulphur Ointment. Wilkinson's Ointment. Hebra's Itch Ointment.

Precipitated Carbonate of Calcium	10 parts.
Sublimed Sulphur	15 ,,
Oil of Cade	15 ,,
Green Soap	30 ,,
Lard	30 ,,

Mix the Lard with the Green Soap and Oil of Cade. Then gradually incorporate the Sublimed Sulphur and Precipitated Carbonate of Calcium.

Vinum Aurantii Compositum.

Compound Wine of Orange. Elixir Aurantiorum Compositum (Germ. Pharm.). *Compound Elixir of Orange.*

Bitter Orange Peel	1600 grains.
Absinthium	480 ,,
Menyanthes, leaves	480 ,,
Cascarilla	480 ,,
Cinnamon (Cassia)	320 ,,
Gentian	320 ,,
Carbonate of Potassium	80 ,,
Sherry Wine . enough to make	16 fluid ounces.

Reduce the six first-named drugs to a moderately coarse (No. 40) powder, mix with this the Carbonate of Potassium, moisten the mixture with Sherry Wine, and let it macerate during twenty-four hours. Then pack it in a percolator, and percolate with Sherry Wine, in the usual manner, until *sixteen* (16) *fluid ounces* of product are obtained.

Note.—The Germ. Pharm. directs to macerate the Orange Peel, Cinnamon and Carbonate of Potassium with the Sherry Wine, and then to add the other drugs in form of extracts. The proportions above given produce a product practically identical with that of the Germ. Pharm.

Vinum Carnis.

Wine of Beef. Beef and Wine.

Extract of Beef	256 grains.
Hot Water	1 fluid ounce.
Sherry Wine enough to make	16 fluid ounces.

Pour the Hot Water upon the Extract of Beef contained in a mortar or other suitable vessel, and triturate until a smooth mixture results. Then gradually add, while stirring, *fourteen* (14) *fluid ounces* of Sherry Wine. Transfer the mixture to a bottle, set this aside for a few days in a cold place, if convenient, then filter, and pass enough Sherry Wine through the filter to make *sixteen* (16) *fluid ounces.*

Each fluid drachm represents 2 grains of Extract of Beef.

Note.—The Extract of Beef suitable for this or similar preparations is that which is prepared by Liebig's method.

Vinum Carnis et Ferri.

Wine of Beef and Iron. Beef, Wine and Iron.

Extract of Beef	256 grains.
Tincture of Citro-Chloride of Iron	256 minims.
Hot Water	1 fluid ounce.
Sherry Wine enough to make	16 fluid ounces.

Pour the Hot Water upon the Extract of Beef contained in a mortar or other suitable vessel, and triturate until a smooth mixture results. Then gradually add, while stirring, *twelve* (12) *fluid ounces* of Sherry Wine. Next add the Tincture and enough Sherry Wine to make *sixteen* (16) *fluid ounces.* Transfer the mixture to a bottle, set this aside for a few days in a cold place, if convenient, filter, and pass enough Sherry Wine through the filter to restore the original volume.

Each fluid drachm represents 2 grains of Extract of Beef, and 2 minims of Tincture of Citro-Chloride of Iron.

Note.—Regarding Extract of Beef, see Note to Vinum Carnis.

Vinum Carnis, Ferri et Cinchonæ.

Wine of Beef, Iron and Cinchona. Beef, Wine, Iron, and Cinchona.

Extract of Beef	256 grains.
Tincture of Citro-Chloride of Iron	256 minims.
Sulphate of Quinine	16 grains.
Sulphate of Cinchonidine	8 ,,
Citric Acid	6 ,,
Hot Water	1 fluid ounce.
Angelica Wine enough to make	16 fluid ounces.

Dissolve the Citric Acid and the Sulphates of Quinine and Cinchonidine in the Hot Water, and pour the solution upon the Extract of Beef contained in a mortar, or other suitable vessel. Triturate the liquid with the Extract, until they form a smooth mixture, then gradually add, while stirring, *twelve* (12) *fluid ounces* of Angelica Wine, and afterwards the Tincture of Citro-Chloride of Iron. Transfer the mixture to a bottle, set this aside for a few days in a cold place, if convenient, filter, and pass enough Angelica Wine through the filter to make *sixteen* (16) *fluid ounces.*

Each fluid drachm represents 2 grains of Extract of Beef, 2 minims of Tincture of Citro-Chloride of Iron, and small quantities of Cinchona alkaloids.

Note.—Regarding Extract of Beef, see Note to Vinum Carnis. Angelica Wine is a variety of sweet California Wine.

Vinum Picis.

Wine of Tar.

Tar	1½ troy ounces.
Water	4 fluid ounces.
Pumice, in moderately fine powder	2 troy ounces.
Stronger White Wine, enough to make	16 fluid ounces.

Upon the Tar contained in a suitable vessel pour *four* (4) *fluid ounces* of cold Water, and triturate the mixture thoroughly; then pour off the Water and throw it away. Mix the remaining Tar thoroughly with the powdered Pumice, and add *sixteen* (16) *fluid ounces* of Stronger White Wine. Stir frequently during four hours, then transfer the mixture to a wetted filter, and, after the liquid has passed, pour on enough Stronger White Wine to make the filtrate measure *sixteen* (16) *fluid ounces.*

The Pharmaceutical Journal.

SATURDAY, AUGUST 18, 1888.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

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PROTECTIVE MEASURES.

THE question is sometimes asked how pharmacists may best indicate to the world the difference between themselves and unqualified dealers in drugs; how manifest the superiority of their knowledge as compared with that of their untrained rivals; how, in fact, they may regain and hold their pre-eminence in their own particular province? And this question is a reasonable one, whilst its utterance is a healthy sign, indicating the desire of the questioner to protect himself. The answer to it is less readily framed; indeed, one can only be expressed in the widest of generalities, for the means of defence must vary as the needs of the individual. However, in so far as broad lines may exist upon which the whole class of pharmacists can work, each one afterwards specializing in accordance with his individual circumstances, we would indicate briefly how, in our opinion, their direction may be determined. Afterwards, we shall be pleased to receive suggestions bearing upon this point of professional advancement. Improvement in the trading aspect must be the result of individual enterprise, but the true pharmaceutical position will be best emphasized and made permanent by the combined afforts of the whole body. Therefore any method by which each individual pharmacist may take part in the emancipation of his class from out and out trade competition, and render evident to the public the nature and value of the special duties performed, will be worthy of careful consideration.

In the first place we shall lay it down as an axiom that before anything strikingly original in any direction can be performed it will be necessary that what has been already done in that direction should be familiar. We inherit from our predecessors the results of their lifework, and it would be the height of folly to reject this foundation for our own labours. In criticising their methods we may afterwards find room for improvement, and reach the same goals by shorter routes, but meanwhile we shall do well to take all upon trust, and conclude that what the average experience of the past leaders in pharmacy has led them to consider the knowledge most worthy of acquirement, will form the best preliminary training for the present generation. Whatever has been found by pharmacists generally to be essential to their complete success should be included in the scheme of education of the pharmaceutical tyro, and this scheme must of necessity be increasingly comprehensive, as successive advances in the science and art of medicine take place. To put the matter in another light, we contend that students should regard the passing of the various examinations, not as a painful necessity, but as a means of indicating that they are acquainted with what has been found to be of value in pharmacy in the past, and that they are therefore well fitted to deal with its modern developments. That the full scheme of pharmaceutical examination does approximately cover all the ground that has been traversed up to the present day is undoubtedly correct, and the successful examinees are, theoretically, conversant with all the twists and turns of the road. If conscientious workers they are practically so. Now let us see what we possess in our graduates. A body of men able to hold their own in the theory of chemistry and in many of its applications, skilled in chemical analysis, fair practical botanists, and with a sound fundamental knowledge of physics and geography. All this, apart from their special skill in general pharmacy. Does not a further step naturally suggest itself, one in the taking of which local associations may play their part, and effect even more good than they have in time past? Besides the continual advancement of pharmacy proper, let the purely scientific culture be cared for in greater degree. Why should not pharmacists, already possessed of a fair knowledge of science, enrich themselves further with her treasures and become her pioneers and exponents in their respective districts? Why, too, should not the drybones of many old provincial associations be clothed and revivified by the same genial influence? Whereas now, matters dull and uninteresting, even to the members themselves, form often the sole intellectual fare offered, the whole realm of Nature lies waiting and ready to furnish the most appetizing delicacies. If pharmacists would but see that they can, with benefit to all concerned, take part in the elucidation of Nature's problems for the many by transposing the specialist's technicalities into language understanded of the people, and if they could realise the numerous advantages they possess which would assist them in so doing, they would surely recognize the special advantages of this proposed method in the great prominence it would give them before their fellow townsmen in the *rôle* of exponents of scientific truths.

Yet another method of inducing the sympathy of the public with our aims, and educating it to duly appreciate our efforts, suggests itself in connection

with the forthcoming annual conference of British pharmacists. Might not the outside world be more directly interested in the deliberations? The older association, to whose stages we accommodate ours year after year, with its greater relative importance and more illustrious actors, yet does not disdain to cater for the non-scientific portion of the community, and why should not we take a lesson from it? It appears to us that the introduction and discussion of matters of immediate public interest, from a physic-taking point of view, could not fail to attract to the Conference proceedings a considerably greater measure of the popular attention, and this would surely react upon our everyday transactions and help the gradual improvement of business prospects. It should not be difficult either to find many suitable subjects. Popular ignorance is great on many points that concern us. But whatever be done, the main thing is to convince the British public that the pharmacist in his own sphere is entitled to his own proper honour. That result effected, all else that is good will follow in due course.

The motion for going into Committee in the House of Commons on the Irish Pharmacy Act Amendment Bill has been postponed until Wednesday, November 14.

* * *

Although no official notification has yet been received as to the postponement of the International Pharmaceutical Congress which was to have been held this year in Milan, it would appear from an informal announcement in an Italian journal that those who had undertaken its organization have at last recognized this step as inevitable. The Congress, it is stated, has now been definitely put off until next year, though the prospect of carrying out this resolution is not free from threatening difficulties. In 1889, according to present arrangements, an Italian Pharmaceutical Congress is to be held in Rome, as well as the General Meeting of the Italian Pharmaceutical Society, and the competing claims of these meetings might detract from the co-operation that would otherwise have been accorded to the cosmopolitan gathering. But it has been suggested that this danger would be avoided and great advantage secured, if the two national meetings could be transferred to Milan, and held about the same time and in connection with the International Congress.

* * *

In the Governor's speech at the opening of the South Australian Parliament promise is made of the introduction of a measure relating to chemists and druggists. It is understood that the reference is to a Bill for the regulation of the practice of pharmacy in the colony, which has been drawn up with the assistance of the executive of the Pharmaceutical Society of South Australia.

* * *

The regency of Tunis has lately become the subject of two decrees regulating the practice of medicine and pharmacy. The decree relating to pharmacy provides that the two callings shall not be carried on by the same person, although he may possess diplomas of qualification for both, except in localities where there is no other medical man. It is also forbidden for a medical man and a pharmacist to enter into any partnership arrangement for carrying on a pharmacy. Except in outlying districts, no person will henceforth be allowed to carry on business as a pharmacist in Tunis who is not the possessor of a qualification entitling him to practise as a pharmacist in the country in which the qualification has been granted, and evidence of the possession of such qualification will have to be deposited with the officials of a district one month before commencing business in it. No pharmacist will be allowed to hold more than one pharmacy, which he will be required to superintend personally; neither will he be allowed to carry on at the same time on the same premises any business other than that relating to drugs, medicines, and articles connected with the healing art and hygiene. Simple substances and non-dangerous specialities in general use may be supplied by the pharmacist freely upon the demand of the buyer; but dangerous substances may only be supplied in medicinal quantities upon the prescription of an authorized medical practitioner, and an entry of the sale has to be made in a book kept for the purpose. A special commission, consisting of two medical men and two pharmacists, assisted by a police officer, is charged with the duty of visiting at least once a year all establishments permitted to supply drugs and medicines in the regency, and to notify to the authorities any contraventions of the law that may come under their observation. Exemptions are granted in favour of persons who for five years before the issue of the decree had been proprietors of a pharmacy and to natives who supply medicines in localities where there is no qualified pharmacist.

* * *

The exhibition of drugs, pharmaceutical preparations, and articles of food, in connection with the meeting of the British Medical Association at Glasgow, to which reference was made in this Journal some weeks ago, is reported to have been very successful. At the close of the exhibition a meeting of the representatives of the exhibitors was held in the Committee room for the purpose of presenting to Dr. Thomson, the Honorary Secretary, an address in acknowledgment of his services, together with a copy of Ziemssen's 'Encyclopœdia of Medicine.' Dr. Thomson, in returning thanks for the presentation, said that he regarded the representation of pharmacy by pharmaceutical chemists as an important feature of the meeting of the British Medical Association, and he expressed a hope that in future they would be enrolled as members, so as to enjoy all the privileges of these meetings.

* * *

Another fatal case of poisoning by carbolic acid has occurred in Liverpool, the poison having been drunk from a bottle in mistake for rum. This makes the second death in Liverpool from the accidental drinking of carbolic acid within the past fortnight.

* * *

Last Wednesday the Midland Counties Chemists' Association held the annual cricket match "Married *v.* Single" at the Cannon Hill Park. The "Single" were winners by 31 runs and the return match is to be played three weeks hence.

Linnean Society of New South Wales.

Some Reputed Medicinal Plants of New South Wales (Indigenous Species only).*

BY J. H. MAIDEN, F.L.S., ETC.

(*Continued from page* 119.)

11. Boronia rhomboidea, Hook, N. O. Rutaceæ, 'B. Fl.,' i., 324.

Although this plant is but a recent addition to the flora of this colony, it has for a long time been used in the southern portion of it as a remedy for worms in horses. The leaves are chopped up and mixed with the fodder.

This species is also found in Tasmania and Victoria.

12. Brasenia peltata, Pursch. (*Cabomba peltata*, F. v. M. in Muell. 'Cens.,' p. 1), N. O. Nympheaceæ, 'B. Fl.,' i., 60.

A "Water-lily."

The leaves are astringent, and have been employed in phthisis and dysentery, especially in North America.

This plant is also found in Victoria and Queensland.

13. Casuarina equisetifolia, Forst., N. O. Casuarineæ, 'B. Fl.,' vi., 197.

"Forest Oak," "Swamp Oak," "Bull Oak."

The bark, according to Dr. Gibson, is an excellent astringent, and may be used with advantage in chronic diarrhœa and dysentery. It is not used medicinally by the natives of India. The Chinese of Bombay say that it is used as an astringent in China (Dymock). Doubtless the barks of the numerous other Australian species possess similar properties. They contain by no means a small proportion of tannic acid.

This species extends to Northern Australia.

14. Cedrela Toona, Roxb. (*C. australis*, F. v. M. in Muell. 'Cens.,' p. 9), N. O. Meliaceæ, 'B. Fl.,' i., 387.

The well-known "Cedar" or "Red Cedar." Called "Polai" by the aboriginals of northern New South Wales.

This tree is also a native of India, and its bark has been found valuable in fevers, dysentery, etc.

It is astringent, and in India it is considered a reliable anti-periodic, and by Dr. Newton a good substitute for cinchona (*Pharm. of India*).

The flowers are considered emmenagogue (Dymock).

This tree is also found in Queensland.

15. Codonocarpus cotinifolius, F. v. M., N. O. Phytolaccaceæ, 'B. Fl.,' v., 148.

The "Quinine tree" or "Medicine tree" of the interior.

This bark, which is exceedingly brittle, and by no means thick, contains a peculiar bitter, and no doubt possesses medicinal properties. The taste is, however, quite distinct from quinine.

This small tree is found in all the colonies except Tasmania and Queensland.

16. Colocasia macrorrhiza, Schott, N. O. Aroideæ, 'B. Fl.,' viii., 155.

I know no aboriginal or colonial name used in New South Wales for this plant, although for Queensland, where it is much better known than here, I have a list of five aboriginal names used in various parts of that colony. "Cunjevoi" is the one best known.

This plant possesses much acridity in the fresh state, and is employed by the natives of India as an external stimulant and rubefacient. The acrid principle is, however, very volatile, and by the application of heat, or simple drying, the roots become innocuous (*Pharm. of India*).

As an antidote to the stings of plants, see *Laportea gigas*.

17. Croton phebalioides, R. Br., N. O. Euphorbiaceæ, 'B. Fl.,' vi., 125.

A "Native Cascarilla." Called "Warrel" by the aboriginals of Northern New South Wales.

The bark contains an agreeable aromatic bitter.

This plant extends to Queensland.

18. Cryptocarya australis, Benth., N. O. Laurineæ, 'B. Fl.,' v., 299.

"Laurel" or "Moreton Bay Laurel" and "Grey Sassafras."

The bark has a persistently bitter taste, due to the presence of an alkaloid which crystallizes from its solution in stellate masses of acicular crystals. When administered to warm-blooded animals the alkaloid produced difficulty of respiration, ending in asphyxial difficulty and death. It also had a poisonous action on cold-blooded animals belonging to the reptilia (Bancroft, in *Australian Journ. of Pharm.*, 1887).

This tree is also found in Queensland.

19. Cucumis trigonus, Roxb., N. O. Cucurbitaceæ, 'B. Fl.,' iii., 317.

This is an aboriginal food, but I am unaware of its use in the colonies as a medicine. In India it is put to very interesting use. The fruit is very bitter, and at the feast of the Diwali, or New Year of the Hindus, is brought to market for sale. The Hindus of Bombay have a custom at this season of breaking the fruit under the foot, and then touching the tongue and forehead with it, with the idea that having tasted bitter of their own accord, they may hope for preservation from misfortune during the year. It is not eaten, but is used medicinally as a purgative.

This plant extends from this colony to Northern Australia.

20. Cymbonotus Lawsonianus, Gaud., N. O. (Compositæ, 'B. Fl.,' iii., 674).

In the southern parts of New South Wales the country people prepare a salve used for wounds, by extracting the medicinal properties of this plant by means of melted lard. Alternate layers of lard and leaves are made, the mass is allowed to cool slowly, and afterwards the lard is run out and is ready for use. Some country folk are loud in their praises of its quick healing effects. Mr. Bäuerlen tells me they copied the use of this plant from the Chinese; although this humble plant is found in all the colonies, it does not extend to China, so that the Chinese probably first used it in quite an empirical manner.

21. Daphnandra micrantha, Benth., N. O. Monimiaceæ, 'B. Fl.,' v., 285.

"Light Yellow-wood," "Satin-wood."

The bark of this tree is intensely bitter, and is in much repute as a tonic amongst sawyers (W. Hill).

Dr. Bancroft has quite recently drawn attention to the properties of this bark, which are similar to those of *D. repandula*, F. v. M. (*vide Australian Journ. of Pharm.*, 1887, p. 104, and 'Proc. R. S. N. S. W.,' 1886, p. 69).

This tree is also found in Queensland.

22. Doryphora sassafras, Endl., N. O. Monimiaceæ, 'B. Fl.,' v., 283.

The well-known "Sassafras," peculiar to New South Wales.

The bark is used as a tonic medicine. It is taken in the form of an infusion.

23. Drimys aromatica, F. v. M., N. O. Magnoliaceæ, 'B. Fl.,' i., 49.

This tree possesses aromatic properties, particularly the bark, which so closely resembles the Winter's Back of the Straits of Magellan (*D. Winteri*), that it is sometimes substituted for it.

This tree is also found in Tasmania and Victoria.

24. Duboisia Hopwoodii, F. v. M. (*Anthocercis* (?) *Hopwoodii*, F. v. M. in Muell. Cens.), N. O. Solaneæ, 'B. Fl.,' iv., 480.

The now well-known "Pituri."

This is the masticatory of the aboriginals of Central Australia, corresponding, in this respect, to the Coca

* From vol. iii. (Series 2nd) of the 'Proceedings of the Linnean Society of New South Wales,' March 28, 1888.

of Peru, the Betel nut of the Eastern Archipelago, the "Taezi Kaat" (*Catha edulis*) of Arabia, etc. The drug is in the form of leaves, more or less powdered, mixed with finely broken twigs, forming altogether a brown herb. So fine is the powder, and so irritating, that the most careful examination of a specimen is attended with sneezing. The plant is, as far as known, extremely local in distribution, and the blacks prize it so highly that they travel enormous distances to obtain it; besides, it is a most valuable commodity for tribal barter. They gather the tops and leaves during the month of August, when the plant is in blossom, and hang them up to dry. They are sometimes sweated beneath a layer of fine sand, dried, roughly powdered, and then packed in netted bags, skins, etc., for transport. I have examined perhaps a dozen packages of Pituri at different times, and they have all been made of netted work, or canvas. Every bag appeared to be precisely the same both in size, pattern and material. The material I believe to be obtained by the aboriginals from gunny-bags or wool-packs; these are unpicked, woven into circular mats about six inches in diameter, and folded over the contained pituri like a jam-tart. The bag is then sewn up with fibre of the same material.* Two of these bags now in the Technological Museum were obtained, the one from Mount Margaret Station, Wilson River, South-west Queensland, to which it had been brought by the blacks from the Herbert River, the other also from the Herbert River, Lat. 23° S., Long. 139° E., near to Pituri Creek. In neither case can more precise localities of the place from which the pituri was procured be obtained, perhaps partly because the blacks do not wish the locality to be generally known, and partly because the packages have passed through so many hands.

Sometimes pituri is chewed in company, a quid being passed round from one native to another, and when they have had sufficient, one politely plasters it behind his ear. It is also smoked, and to prepare the leaves for this purpose they are damped, mixed with potash prepared from the ashes of suitable plants, and rolled up in the shape of a cigar. This is often chewed, and the saliva swallowed.

In small quantities pituri has a powerful stimulating effect, assuaging hunger, and enabling long journeys to be made without fatigue and with but little food. It is also used by the aboriginals to excite them before fighting. It is used to poison emus.

Wills' diary from Cooper's Creek (p. 283) has the following under date May 7, 1861:—"In the evening various members of the tribe came down with lumps of nardoo and handfuls of fish, until we were positively unable to eat any more. They also gave us some stuff they call *bedgery* or *pedgery*; it has a highly intoxicating effect when chewed even in small quantities. It appears to be the dried stems and leaves of some shrub."

"The pituri consists of leaves broken into small particles and mixed with acacia leaves, small dried berries containing reniform seeds, and unexpanded flower buds of the shape of a minute caper."

In March, 1872, Dr. Bancroft, of Brisbane, read a paper before the Queensland Philosophical Society on pituri. He obtained specimens from a Mr. Gilmour, who had procured them from the neighbourhood of the Kulloo water-hole, eight miles beyond Eyre's Creek. He stated that the use of the pituri is confined to the men of a tribe called Mallutha, all the males of which are circumcised. The pituri caused a severe headache in Europeans who used it.

Dr. Bancroft then summarizes the effects of an infusion of pituri at some length.

Dr. George Bennett, of Sydney, has some notes on the drug in the *N. S. W. Medical Gazette*, iii., 8, May, 1873. This pituri was obtained from the same source as that used by Dr. Bancroft, but was in a damaged condition.

In September, 1878, Mr. A. W. Gerrard experimented with a very small quantity (30 grains) of pituri which had come into his possession. He found an alkaloid, to which he gave the provisional name of "pituria," but, on account of the smallness of material available, he was unable to describe its properties with much definiteness (*Pharm. Journ.*, [3], ix., 251).

Loc. cit., p. 638, will be found a chatty account of pituri taken from the *Lancet*, to which it was sent by Mr. J. P. Murray, surgeon to a Central Australian Exploring Expedition.

M. A. Petit having obtained a quantity of pituri repeated and supplemented Mr. Gerrard's experiments. See a paper in the *Pharm. Journ.*, [3], ix., 819. He pronounces the alkaloid contained in the substance to be nicotine, and quotes some physiological experiments by Professor Sydney Ringer and Murrell as supporting his view,

On November 3, 1880, Professor Liversidge, of the Sydney University, read a paper before the Royal Society of N. S. W. on the subject. He had more material at his disposal than had previous observers; moreover, his research is probably the most exhaustive that has ever been made on the subject. The paper ('Proc. R. S. N. S. W.,' 1880, p. 123) scarcely bears abstracting. Professor Liversidge isolated a brown liquid, acrid alkaloid, distinct from nicotine, which he calls *piturine*.

This plant is found in the interior of all the colonies except Tasmania and Victoria. In other words, from the Darling and Barcoo rivers to West Australia.

25. DUBOISIA MYOPOROIDES, R. Br., N. O. Solaneæ, 'B. Fl.,' iv., 474.

Called "Corkwood" and "Elm" by the colonists, and "Onungunabie" by the aboriginals of the Clarence River. "Ngmoo" is another aboriginal name.

The first important statement as to the narcotic effect of this plant, I can find, is recorded by the Rev. Dr. Woolls, from a correspondent of his.

"It has an intoxicating property. The aboriginals make holes in the trunk and put some fluid in them, which when drunk on the following morning produces stupor. Branches of the shrub are thrown into pools for the purpose of intoxicating the eels, and bringing them to the surface. I have known an instance in which giddiness and nausea have arisen from remaining in a close room where branches of it have been placed."

The smell is faint and sickly, but with nothing like the intensity of *D. Hopwoodii*.

Baron von Mueller directed the attention of Dr. Bancroft of Brisbane to the probable medicinal properties of this plant, and the latter obtained an extract from it which he found useful in ophthalmic surgery, and he brought it before the medical world.

The leaves owe their active properties to the presence in them of an alkaloid called *duboisine*, which Ladenberg pronounces identical with *hyoscyamine*, albeit there are minute differences between them. The method adopted by Mueller and Rummel to obtain the alkaloid will be found in the 'Organic Constituents of Plants' (Wittstein, Mueller's translation).

For an account of the latest researches of Prof. Ladenberg on the subject, see an abstract in *Pharm. Journ.*, 25th June, 1887.

For an account of Gerrard's experiments with the alkaloid of this plant, together with some physiologi-

* In the South Australian Museum the following pituri bags (amongst others) may be seen:—

1. Skin of small animal, with the flesh-side outwards.
2. Bag of blue and red stripes, probably of European yarn.
3. A bag with red stripes, and stripes of the usual unbleached fibre.

cal experiments with it, *vide Pharm. Journ.*, [3], viii., 787 *et seq.*

In practice, the sulphate of the alkaloid, which forms golden-yellow scales, is usually preferred. The dose is from $\frac{1}{120}$ to $\frac{1}{30}$ of a grain.

Dr. Dujardin-Beaumetz substitutes this alkaloid for atropine in exophthalmic goitre.

The extract is said to have been given with great benefit in cases of the night sweats of phthisis, without producing any bad effects on the appetite. It produced entire relief from pain in a severe case of vesical tenesmus from inflammation of the urethra and neck of the bladder.

The following references to the alkaloid are taken from Martindale and Westcott's 'Extra Pharmacopœia.'

It dilates the pupil, dries the mouth, checks perspiration, causes headache and drowsiness, antagonises muscarine; on the eye it acts more promptly than atropine (*Lancet*, i., 1878, 304).

Eight cases of toxic symptoms, giddiness, delirium, and dryness of the mouth from use of eyedrops four grains to the ounce (*L.*, ii., 1879, 353).

As a mydriatic it is much stronger than atropine. Its use requires care; it is apt to produce giddiness, etc., and even delirium (*L.*, ii., 1879, 441).

Its action relative to atropine, physiologically, etc. (*Practitioner*, xxiii., 246).

Therapeutic and physiological effects. Differs from atropine by the persistence and greater rapidity of its action on the muscle of accommodation; is a useful calmative in maniacal delirium; as a sedative ointment 1 in 500 of vaseline applied night and day is useful in inflammation of the cornea (*Pr.*, xxv., 294).

In exophthalmic goitre, $\frac{1}{120}$ grain two or three times a day gives great relief (*B. M. J.*, i., 1883, 958).

Résumé of its physiological properties in *Lancet*, ii., 1881, 806; *British Medical Journal*, ii., 1879, 362, ii., 1881, 529; *Trans. Med. Congress*, 1881, i., 511.

This tree is also found in Queensland.

26. ERYTHRÆA AUSTRALIS, R. Br., N. O. Gentianeæ, 'B. Fl.,' iv., 371.

"Native Centaury."

This plant is useful as a tonic medicine, especially in diarrhœa and dysentery. The whole plant is used (not the root alone, as in the case of gentian, for it is very small in the plant), and is pleasantly bitter. It is common enough in grass-land. It appears to be increasing in popularity as a domestic remedy. The first reference to its use I can find is in Wools' 'Flora of Australia,' p. 7. No doubt knowledge of the natural order of this plant suggested its use.

It is found in all the colonies.

27. EUCALYPTUS spp.

It is very difficult to trace to individual species the properties ascribed to Eucalyptus and its products. Eucalyptus is a name very loosely used by many people, who forget that this large genus comprises (Baron Mueller's 'Census') no less than 134 species, (while a fresh one is occasionally discovered), and some of these have varieties so well marked as to be classed as distinct species by some authors. It should not be lost sight of that in this vast genus the properties of different species are frequently very different, so that to describe a product as simply "Eucalyptus" is but a bald description, and one likely to lead to great confusion. There is some excuse for this, however, as Eucalyptus products have only been brought under notice during the past quarter of a century; and some allowance must be made to outsiders in respect to their references to a genus so imperfectly known to Australians themselves. The leaves and flowers are usually far removed from the ground (especially the flowers), and some apparatus not usually possessed by pedestrians must be used to obtain the latter. They are therefore comparatively unfamiliar; this is doubtless partly the reason why they are not better known.

Eucalyptus contain a *volatile oil*, varying in composition to some species, and of a somewhat complex nature, a bitter or *tonic principle* in an amorphous condition, and strongly hygroscopic, and a kino.

The following species may perhaps be considered the chief medicinal species:—

For volatile oil, *E. amygdalina*, Labill.; *E. oleosa*, F. v. M.; *E. Globulus*, Labill.

For bitter principle, *E. rostrata*, Schlecht.; *E. Globulus*, Labill.

(All the above are New South Wales plants, *E. globulus*, just coming into our territory.)

For Kino (those marked with an asterisk are found in New South Wales).

* *E. rostrata*, Schlecht.
E. calophylla, R.Br.
* *E. corymbosa*, Smith.
* *E. maculata*, Hook.
E. tesselaris, F. v. M.
* *E. siderophloia*, Benth.
* *E. amygdalina*, Labill.
* *E. piperita*, Smith.

It was formerly imagined by some that Eucalyptus leaves contained *quinia*, or some other of the well-known alkaloids of Cinchona barks. But the experiments of Broughton, the Government Quinologist, Ootacamund (India) entirely disprove this; for upon careful examination of the bark and leaves, this chemist states that neither *quinia*, nor any of the other alkaloids of Cinchona barks as *quinia*, *cinchonia*, or *cinchonidia* exist in the plant in any proportion. The properties of the leaves therefore, so far as is known at present, depend entirely upon the volatile oil (Bentley and Trimen, 'Medicinal Plants,' 109).

The latter statement is scarcely correct, as they owe some of their properties to the bitter principle already referred to.

The juice of Eucalyptus leaves of various species has been used as a stimulant for the growth of the hair, much in the same way as rue is used, but although the remedy certainly can do no harm, the cases in which good is reported to have ensued are not so well authenticated as one could wish.

Mr. Baker (United States Consul at Buenos Ayres) reports that the people there bruise the leaves of *E. Globulus*, and bind them to the forehead in nervous headache.

The leaves of *E. Globulus* and other species possess febrifugal properties to some extent, and Mr. Bosisto has prepared a *Liquor Euc. globuli*, which is sold as a fever and ague remedy. It is said to counteract malaria without exciting the prejudicial effects of quinine on the nervous system. It is also used as a general tonic.

In the *Aust. Journ. of Pharm.* for May, 1887, occurs the statement that a miner at Kimberley, Western Australia, cured himself of scurvy by making a decoction of the leaves of a "White Gum." What species of Eucalyptus is alluded to I cannot guess at.

The dose of Eucalyptus is given in Martindale and Westcott's 'Extra Pharmacopœia' at 5 grains or more in powder. When coarsely powdered they are employed for smoking in cigarettes in cardiac and aneurismal asthma.

The following references are obtained from the same source:—

History of the drug, its uses and botanical origin. Is a febrifuge; the leaves are also used as a healing application to wounds (*Med. Times and Gaz.*, i., 1874, 540; *Pharm. Journ.*, 1874, 872, 1879, 865).

Ague, rapid cure of, by 1 to 2 drachm doses of the tincture (*Practitioner*, xviii., 366).

In ozæna, bronchitis, with profuse foul expectoration, and uterine catarrh, tincture and infusion used both internally and externally (*Pr.*, xx., 206).

Tincture used in intermittent fever (*Pr.*, xx., 411; xxiv., 138).

Use of steam from the infusion of leaves in infectious diseases, especially diphtheria (*Lancet*, i., 1883, 316).

A correspondent writes to the *Town and Country Journal* of Sydney strongly recommending the use of bruised gum-leaves in fowl-cholera, and other diseases of the poultry-yard. The leaves are astringent, and there is no doubt they would be useful on that account. Our knowledge of the diseases of poultry is almost nil, so the simple and readily available remedy of gum-leaves is worth trying.

"In France, five different Eucalyptus preparations are in use:—*

1. A tincture made by an alcoholic maceration of the fresh leaves.
2. A tincture made from the dry leaves by the same process.
3. An alcoholic extract.
4. A wine.
5. A liniment prepared from the essence (*sic*).

"It is interesting to note that the preparations used in Italy against the marsh fevers in Rome and its vicinity all come from a place called Tre Fontane, and have the form of a highly concentrated ethereal extract and an alcoholic elixir.

"If a few drops of a Eucalyptus preparation are placed on the tongue a sensation of pungent freshness, soon followed by one of warmth, is experienced, the latter being due to hyper-secretion of the salivary and buccal glands. Its ingestion into the stomach creates a similar sensation of warmth, and, besides, an emission of its characteristic odour by the mouth. The urine reveals a faintly violet coloration, indicating the passage of the drug through the system. . . . . Larger doses of the drug produce headache, malaise, general fatigue and prostration, and, as shown by Gimpert, fatal results in animals, by paralysing the reflex motor centres of the spinal cord." *La France Médicale*, Nos. 43–5, 1885, quoted in *Therapeutic Gazette*, of Detroit, U. S. A.).

"An honourable and noteworthy rank as an auxiliary in miasmatic fevers is all that can with propriety be claimed for the preparations of Eucalyptus. . . . . The statement that Eucalyptus exerts its antipyretic character also in the thermal elevations of tuberculosis and cancer, appears, if true, all the more noteworthy, as its virtues in this direction have been most generally overlooked.

"Important as the antimiasmatic and general antipyretic properties of Eucalyptus† unquestionably are, it is in the laryngeal and bronchial inflammatory affections that the drug renders its most signal service. Its action in this respect rivals turpentine and tar, and offers even advantages in being better borne by the digestive organs and being more easily administrable.

"Dr. Gimpert, of Cannes, the celebrated consumption specialist, believes it to be of benefit in tubercular diseases, but warns, however, against exhibiting the drug in two large doses, lest hæmoptysis should set in." (*La France Médicale*, *loc. cit.*).

The value of Eucalyptus oil in the various catarrhal affections of the urino-genital apparatus is likewise great. (I hope to deal with oils on a subsequent occasion.)

Dr. Owen reports in the *Australian Medical Journal* of September 15, 1885, the case of a child 17 months old which was poisoned by drinking a few drops of Eucalyptus extract out of a supposed empty bottle. The symptoms were alarming, but the patient recovered under proper treatment.

* These preparations from France were actually on sale at the recent Adelaide Jubilee International Exhibition.

† The oil is undoubtedly referred to here.

Ramel is to be credited with having first suggested the idea of planting Eucalyptus trees in Europe, with the view of thus ridding territory from baneful marsh and malarial fevers. The same object led to its cultivation at the Cape. It was this ingenious transplantation of species of this genus to the vicinity of Rome that enabled the Trappists of Tre Fontane to recover and render habitable a vast area formerly exposed to the ravages of malaria. It is highly probable that the disinfectant power of the tree depends largely upon its capacity to absorb large quantities of water from the surrounding soil, and thus desiccate the germs of malaria.

Baron Mueller's services in forwarding the seeds of *E. Globulus* and other species to the Trappist Fathers of Tre Fontane (through the late Archbishop Gould of Melbourne) must not be forgotten.

Those who care to further pursue the subject of Eucalyptus forests in regard to health, will find the matter discussed in some of its bearings in the learned Baron's 'Eucalyptographia' (where the hygienic properties of the trees are summed up), and in various other works and papers.

The subject of Eucalyptus preparations from a medicinal point of view has even now a voluminous literature.

Eucalyptus *kinos* are exceedingly astringent substances. The majority are ruby-coloured and soluble in water without turbidity. They are really very valuable in cases where an astringent remedy is indicated, but as exposure to sunlight and moisture on the trees for any length of time produces great alteration in their composition, disappointment may result if the following simple method be not resorted to in preparing a kino. Boil the kino with water, filter, evaporate to dryness by means of a water bath. Keep the residue in a stoppered bottle not unnecessarily exposed to the light. The refined substance thus prepared will tend to have a constant composition. The dose is from 2 to 5 grains for an adult.

In Martindale and Westcott's 'Extra Pharmacopœia' will be found a list of preparations in which Eucalyptus kino may be used. That of *E. rostrata* has been freely recommended by Mr. Bosisto of Melbourne, and is doubtless a valuable kino, but any of the clear, freely soluble kinos above alluded to can be used for all ordinary purposes.

A discussion and investigation of the properties of our numerous kinos is beyond the scope of this paper.

28. EUGENIA JAMBOLANA, Lam. (*E. Moorei*, F. v. M., in Muell. 'Cens.,' p. 59), N. O. Myrtaceæ, 'B. Fl.,' iii., 283.

A vinegar prepared from the juice of the ripe fruit is an agreeable stomachic and carminative; it is also used as a diuretic in India. The bark is a useful astringent. The expressed juice of the leaves enters into Indian medicine in various ways.

This tree is also found in Queensland.

(*To be continued.*)

New York State Pharmaceutical Association.

FLOWERS AND THEIR WINGED FRIENDS.*

BY R. G. ECCLES, M.D.

The shapes of leaves, the positions of ribs, veins and veinlets, the lengths of stems, and in fact everything about the make-up of a plant, is now generally believed to be a surviving resultant of forces that have played around their progenitors. As the impress of a printed page is a reversed image of the type that made

* A paper read at the New York State Pharmaceutical Association. From the 'Proceedings,' 1888.

it, so they in a sense bear an analogous relation to the environing forces of past generations. Within the blossom the most marvellous part of this whole history of development can be found recorded. Here we read a chapter of Genesis, penned by the Supreme Power that guides and centres in the vast procession of material movements from galaxy to atom. To every change, tortuous curve and angle assumed in the endless transmutations of matter and energy, the living protoplasm of the vegetable world has sought to mould itself. Wherever and whenever it has failed, extinction has been the doom; but nothing daunted, the plastic mass presses in a new supply again and again, until the final fitness has been reached. Wet soil and dry, gravel and sand, sunshine and shade, hot climate and cold, loam and clay, windy regions and calm, hills and valleys, swamps and deserts, oceans and mountains, plateaus and prairies, all have been sown over and over again. The best adapted to the conditions have alone survived. Millions of seeds germinate annually, only to perish because of unfitness. The number that develop in a single year could no more find room to grow up to maturity than fifty men could be crammed into a box made and measured for one. That one may live, hundreds must die, crushed from their places by the better-fitted form. Thus are the adapted preserved to perpetuate their kind, while the non-adapted perish from the earth. In the new struggle of the succeeding year, some trifling advantage determines the fitness and maintains itself by heredity. Year by year such fitnesses accumulate, moulding and altering the shape of the plant. Each as it stands to-day, whether plain or beautiful, represents the accumulated savings of this kind made through thousands of generations. In our most handsome flowers, beauty and utility have met and kissed each other. Every hue, curve and line that evokes our admiration reacts upon the possessor, tending to its preservation and consequent perpetuation. Within the charmed circle of their forms a miracle of miracles is wrought in the development of seeds. To improve the quality of these or to increase their quantity all this loveliness exists.

Every seed is but a crystallized memory of the past history of its kind, and every plant the realization in fact and experience of the grandest features of that memory. Every flower contributes to this centralized retentive force, not only its own experience and that of its progenitors, but it receives from afar the experiences of other flowers, and in ways most wonderful compacts them into a single record. The greater the experience, potentially centred in a seed, the more marvellous its powers of adaptation as a plant to conditions we might think new for it. The actual facts of nature scarcely seem credible in this direction, when first stated. The wildest romance cannot exceed in wonder the reality as discovered in this department of Botany. That a developing seed could receive a fitness in its structure for a wet or rocky soil while grown upon that which is dry and loamy seems impossible. That such fitness should be carried as a message from plants of the same species miles away and taught to that seed before it had scarcely begun to develope in the parent flower, appears as if beyond sane belief. All this is nevertheless but a sober statement of what has been discovered by actual experiment. Two trees, shrubs or herbs, remote from each other, can interblend their natures and combine their powers through the medium of a tiny dust like particle of pollen. The seeds and plants derived from the union possess in large degree the fitnesses of both. During the flowering season such unions are of constant occurrence. The multiform structure and innumerable conditions of the earth's surface demand a corresponding multiplicity of powers of adjustment in its inhabitants. While it is desirable that a plant shall perpetuate its kind, it is still more desirable that it shall give as its progeny, forms with powers of adaptation superior to its own. Without the distinctions of sex and without cross-fertilization, whereby plants remote in kindred from each other can unite their powers of resistance to deleterious influences, progressive evolution, slow as it now is, would be much slower. A plant held incessantly within a narrow limit of conditions, and producing only progeny capable of enduring such conditions, would be hemmed in upon every side, unable to progress or alter in any manner. United through its pollen with others having different powers and experiences, a new race is born with a double capacity of adaptation. Professor Darwin experimentally proved that crosses between individuals give vigour in proportion to the variety of conditions to which the parents are subjected, and not in proportion to remoteness of kin. Foxglove (*Digitalis purpurea*, Lin.), when crossed from plants growing near together in similar soil, shade and surroundings, never gave as good seed as when crossed with pollen from plants of a remote neighbourhood ('Cross and Self-Fertilization,' p. 447). The flower stems produced in the two cases were as 100 to 47, and the average height as 100 to 70. Plants near of kin, but raised in remote regions, when cross fertilized with each other gave improved stock. Plants remote of kin, but grown near each other, when crossed gave inferior results. It seems like the work of a magician to talk into a phonograph and then have the waxed sheet or tinfoil echo back every word distinctly, days or years afterwards. How much more wierd and startling is the fact that every tiny pollen grain, microscopic in its minuteness, is able to unfold its registered impressions and whisper to the embryo seed the life history, not only of its immediate producer, but also that of past generations. When we pass through the woods or garden and the little dust specks cling to our garments, how many of us pause to consider that each impalpable particle we are so desirous of brushing away is a volume containing more wonderful and more accurately recorded facts than any man could write? Viewed with the microscope, traces of its beauty appear, but no key is thus discovered to its unfathomable potentiality! Only when it has given up its secrets to the seed, and that begins to talk to our eyes through the fretted network of unfolding cells and the strange revelations of leaves and flowers, can we appreciate its continued store of information. How precious seem these little golden grains the moment we are able to understand their work and what they are. When we see them wafted abroad and borne to destruction by wind and rain, we wonder at the profligacy of nature and ask ourselves what it can mean. When carefully looked into we discover that this waste is inversely as the specialization of the plant and that the highest forms guard it as human beings would precious gems. The apparent wantonness of waste appears most prominent at the bottom of the scale of flowering plants. Higher up we have closed corollas of a single petal or irregular forms with a number of petals, where in each case the pollen product is cared for. Every grain seems to be husbanded for the perpetuation of the plant or in some indirect manner to aid that perpetuation. For a plant to squander its life force in producing a superabundance of pollen is to lessen its resisting power against adverse forces in some other direction. In the struggle for life those survived best that were able to get the largest number of healthy representatives, with a minimum of such expenditure. Every plant that gained some contrivance to save its pollen from loss became the parent of more vigorous offspring. Little changes that aided but slightly were multiplied through successive generations until great changes were the result. Plants occupying positions that caused unusual strain upon their structures, were

those that such savings and the consequent reserve force benefited most. But this saving of pollen introduced a necessity for some contrivance to carry it in an economical manner from plant to plant. The method chosen shows the perfection of natural adjustments to a remarkable degree.

The earliest and simplest means of conveyance was that of the wind. Many plants depend upon this method of dissemination for the ripening of their seeds, as without pollen no seeds will ever ripen. The yew tree is a fitting illustration. Some yews bear only flowers capable of producing pollen, while others bear such as are able to utilize that pollen in forming seeds, but themselves form no pollen. Pollen bearing flowers are called staminate, and seed bearing ones, pistillate. If a yew that bears only pistillate flowers is shielded from the pollen blown from the staminate, it cannot produce a perfect seed. All kinds of plants do not have their pistils and stamens separated on different trees in this way. The oak, indian corn, pumpkin and watermelon are examples of some in which a single plant contains both kinds of flowers. In the corn we have the staminate flowers at the top and the pistillate lower down among the leaves. The former popularly bears the name of "tassel" and the latter "silk." When the pollen dust from the tassel is blown upon the silk, the corn ripens. To protect or shield the silk from this dust would be to keep the plant from ripening a single grain upon the ear. There is still another arrangement of pistils and stamens in which both are crowded together upon a single flower. This indeed is the most common plan. The pistils and their seed-bearing ovaries occupy the centre of the blossom, while the stamens, like a circle of sentinels, stand guard around them. This is the case in the rose, buttercup, geranium and the large majority of handsome flowers. The beautifully coloured petals possessed by so many of these is something never found upon such as depend on the wind for fertilization. Their production of pollen is also less since the necessity to sow every inch of the country that perchance a few grains may strike the stigma or top of the pistil of a kindred plant is now at an end. But how? The bringing together of both organs in a single blossom tends to self-fertilization, which has been shown to injure them. A careful examination of these flowers will reveal a most wonderful and almost numberless set of contrivances evidently intended to keep the pollen of the same blossom from reaching its stigma. These are in all degrees of perfection from those that allow of free contact to those that exclude all possible contact. Every plant has two things to guard against. It must exclude its own pollen to maintain its highest vigour, but it must not continue this exclusion where there is a great uncertainty of securing a supply from a neighbour. Self-fertilization, though bad, is better than no fertilization at all. To accomplish the main object of gaining, without waste, plenty of pollen, and that from a distance, the rich fragrance, bright colours, handsome forms and delicious nectar, all have been evolved. They are allurements to the winged denizens of the air, who act the part of Cupid in the love matches of the flowers. Orchids and lilies, carnations and pansies, with numberless other forms of grace, owe their beauty to selections thus accomplished. On any bright day of the summer months in the forest, on the prairie, or in the garden, they can be seen at work consummating these unions. Have you ever watched their movements or observed what they were about? Butterflies and moths, bees and humming birds, lingering around a bed of flowers, are doing more than enjoying themselves with the fragrance, and sipping the honey from the nectaries. The apparently trivial act of one of these in seeking food is fraught with changes of great importance to the floral world. They carry upon their bodies supplies of pollen, which are borne from plant to plant. If you watch a bee as he awkwardly tumbles among the bent-down stamens of mountain laurel (*Kalmia latifolia*, L.) you will observe them spring up one by one, and cover him all over with their yellow dust. This he bears away to another plant of the same kind, where, by his movements, it is rubbed off upon the stigmas. Upon close inspection it will be found that as a rule the part of the insect bearing the largest pollen load is the very part he finds it necessary to turn towards the stigma in honey-bearing flowers when he seeks their sweet product. In lilacs and some others the insect first gets its head daubed with honey and then with pollen, which thus adheres, until reaching another flower he rubs past the stigma where it is deposited. In many other flowers the pollen is naturally rough or sticky, and makes itself fast to whatever part of the insect presents itself. In some it is strung like beads on threads, in others it is in little packets cohering together. Sometimes it is projected with force against the insect so as to facilitate adhesion. In a few cases it is locked up in little boxes which the insect's touch opens. In the butterfly weed (*Asclepias tuberosa*, L.) it forms a mass that attaches itself to the claw of the insect, and is thus caused to enter a narrow slit in the next flower containing the stigma.

All of these methods are fitted to the peculiar nature of the plant and its mode of life. The size of the pollen grains seems to be adjusted to the length of the style down which it has to grow to reach the embryo seed. In many plants the application of pollen from a distant individual of the same kind will immediately arrest the development of its own pollen that had started to grow upon the stigma. In others, only pollen from a distant individual will develop. In this way self-fertilization is kept down. Wind-fertilized plants are frequently fertilized by insects, and from them it is believed all our pretty flowers sprang. They occasionally display beautiful colours when the vitality of a part is low, and honey and odour frequently can be found upon them. These were evidently the starting points for selection to work upon in leading up to lilies, geraniums and orchids. Those plants that displayed the greatest amount of a colour pleasing to certain insects were most often visited, and hence best fertilized. The least beautiful, if unable to continue producing pollen enough for wind fertilization, and failing to attract insects in sufficient numbers, were necessarily slowly extinguished. Every added beauty to a flower, by increasing its attractiveness, gave it the advantage in the struggle over its fellows, because it was made to produce more and better seeds. Features of colour, shape or odour, pleasing to one kind of insect, proved displeasing or indifferent to another, so that a large variety of forms resulted. Dull yellow flowers are evidently obnoxious to beetles, for we find that they almost entirely avoid them. Dull purple seems to be the choice colour of the host of minute insects that swarm around marshes, the margins of lakes and wet places generally. White is the favourite colour of night-flying moths. Butterflies and bees choose brilliant reds, pinks, blues and violets. Step by step the colours become more and more intense, as the struggle for life continues. By actually counting the number of insects visiting various flowers during the course of a day, it is found to be the universal rule that where other things are equal those blossoms that are most conspicuous are oftenest visited. The visits are always directly as their conspicuousness, unless some other attraction or repulsion comes in play. Odoriferous violets, though much less conspicuous than large and beautiful pansies, will have more visitors. The fragrance is here the great allurement. In the matter of shape, selection has reference to four things,

viz: (1) the protection of honey from rain; (2) the protection of pollen from wind; (3) the protection of honey from freebooting insects that would not fertilize; and (4) the providing of conveniences for standing, shelter or safety to their favourite insects. Plants allowing their honey to be washed away must die out from lack of visitors. Insects have no time to waste on such as they. Where the supply of pollen is insufficient for wind-fertilization, to allow it to be blown away and wasted is evidently to be on the high road to destruction. Only those that avoided this survived. If thieving visitors were allowed to carry off all the honey, while making no attempt at fertilizing, those plants gaining no provision to put an end to this would soon die out. Every change that facilitated them in protecting themselves here, was a decided aid in the struggle for life, and gave those having it the advantage. Where insects have a choice between flowers offering protection and conveniences for themselves as well as honey, they are not going to those that only supply the honey. The simplest alteration of form that aided the insect was therefore of benefit to the plant, enabling it to survive and propagate its kind while the less favoured perished. Changes, however insignificant at first, became from successive accumulations in a common direction very marked in the end. With the change in form of the plant, a corresponding change in the make-up of the insect was necessitated. As the honey receded deeper into the blossoms, the proboscides of the fertilizing insects would prove too short. Such as failed to gain longer ones died of starvation or were forced to seek other sources of supply. A constant picking out of those with longer and longer tongues in this way continued. The pollen, by being shielded from wind, rain and other foes, had in some flowers a similar tendency to hide itself down deep in the same. Parallel with this change would necessarily be in many cases some corresponding change in such insects as fed upon this pollen. The intelligence, too, of the insects must have been directed by plant changes calling it into play, and those that were stupid were used in their stupidity to favour cross-fertilization. The Cuckoo-pint or *Arum maculatum*, L., with some other Arums, have perfect traps to catch senseless flies and hold them prisoners until their pollen is shed.

(*To be continued.*)

Parliamentary and Law Proceedings.

The Lewisham Poisoning Case.*

At the Middlesex Sheriff's Court, on the 9th inst., before Mr. Under-Sheriff Burchell and a jury, an action was heard in which Mrs. Catherine Ann Brewster sought to recover damages for the loss of her husband from Mr. Edward Lawrence Henry.

Mr. G. A. Vennell, barrister, represented the plaintiff. No counsel was in attendance for the defendant.

The plaintiff, according to the opening statement of counsel, is a widow, residing at No. 57, Court Hill Road, Lewisham, the defendant being a chemist, carrying on business at Loampit Vale, Hither Green Lane, also in Lewisham. Plaintiff is the widow of a publican, who was the proprietor of the Sir Daniel Brewster public-house at Lewisham, and also carried on business as a builder. On the 17th of June last a medical student, named Malcolm Cowan, and a friend of Mr. Brewster's, called at his house. Mr. Brewster complained of headache, and Cowan suggested that he should take five drops of solution of strychnine in a seidlitz powder, remarking that he often took it himself. Deceased asked, as he could not get the strychnine himself, whether the medical student would get it for him. To this Cowan consented, and went to Henry's shop, where he asked for the five drops of solution of strychnine, to be mixed with half a seidlitz powder. He was served by a young man named Eugene Henry, aged 22, the son of the defendant, but instead of supplying five drops of solution of strychnine the assistant put in eight grains of strychnine, equal to about two ounces of liquor strychninæ, which counsel said was sufficient to kill twenty persons. The bottle into which the strychnine was put was not labelled "Poison," but simply "the draught," nor was there any statutory entry in the chemist's book of the sale of the poison. It was further alleged that the assistant made no inquiries as to what the poison was for. Mr. Brewster, who was a strong, hale, and hearty man of about 70 years of age, took the draught next morning, and in six minutes he was dead. At an inquest subsequently held, the medical student and the chemist were severely censured, as was also the son. The widow now brought an action, under Lord Campbell's Act, to recover damages. Counsel said the act was one of very gross negligence, and complained strongly that the defendant had put in no appearance, which was really treating the case with utter contempt.

After hearing evidence, the Under-Sheriff, in summing up, said it would have been more satisfactory had the defendant come before them, but he thought, perhaps, if the jury gave a verdict for a moderate amount it would be more advantageous for the plaintiff, as she would perhaps be more likely to get the money.

The jury awarded the plaintiff £200.

At Greenwich Police Court, on Tuesday, the 14th inst., Eugene Henry, a chemist's assistant, of 128, Hither Green Lane, Lewisham, was summoned by Superintendent Butt, of the P Division of Police, "for unlawfully selling a certain poison—to wit, strychnine—to one Malcolm Cowan in a vessel, such vessel not being distinctly labelled with the name and address of the seller of the poison, and omitting to cause any entry to be made of the sale in a book kept for the purpose, contrary to the statute." This was the case in which Malcolm Cowan, a medical student, of 33, Ryecroft Road, Lewisham, went to the shop in Hither Green Lane and asked for five drops of liquor strychnine to be mixed in a seidlitz powder, and was served by the defendant, who acted as assistant to his father, with equal to eight grains of strychnine. Mr. Cowan gave this to Mr. Peter Brewster, who swallowed the eight grains mixed with the seidlitz powder and died in a few minutes.

Mr. Fenwick told the defendant that it was a serious case, and fined him £5 and 12s. costs.

Injunction as to Use of a Trade Mark.

In the High Court of Justice (Chancery Division), Mr. Justice Kay has granted a perpetual injunction restraining J. Holdroyd, of Westgate, Cleckheaton, his servants, and agents, from infringing the registered trade mark, No. 27,738, of H. Wright, Bridge Street, Bradford, which consisted of the word "Earaline" in conjunction with a device; and also perpetually restrained the defendant, his servants, and agents, from passing off or attempting to pass off any medicinal preparation (for the cure of deafness, etc.), not of the manufacture of the plaintiff, as or for the goods of the plaintiff, by the use of the word "Earaline," or by the use of any device, or by advertisement, or otherwise, and ordered the defendant to pay to the plaintiff his costs of the action, the plaintiff accepting the damages paid into court by the defendant—*Bradford Observer.*

* See *Pharm. Journ.*, June 23, p. 1081.

Review.

NATURE'S HYGIENE; a Systematic Manual of Natural Hygiene. By C. T. KINGZETT, F.I.C., F.C.S. 3rd edition.*

This seems at first sight a valuable work, especially suited for spreading an intelligent appreciation of the broad principles of health and disease among the general public, and thereby securing much needed improvements in general sanitary matters. It is an attractive-looking volume, well printed in large type, and, as its name implies, deals with the natural agencies at work in getting rid of effete and noxious products, and maintaining a healthy state of surrounding affairs; more especially does it concern itself with the products of the pine and eucalyptus, which the author has made a specialty.

The subject is opened by a preliminary explanation of some of the elementary principles of chemistry which bear upon the subject, mainly dealing with oxygen, ozone, and peroxide of hydrogen. In speaking of ozone the author throws cold water on the popular idea of the presence of this substance in the atmosphere and its good effects; but administers comfort by adding that although the presence of ozone is doubtful, if this is not present peroxide of hydrogen is, and the effect is practically the same. This latter substance the author prefers to represent by the formula $\begin{matrix}H\\H\end{matrix}\!>\!O=O$ rather than the ordinary one H – O – O – H, his formula involving the assumption that oxygen is here acting as a tetrad element. The processes of oxidation, fermentation, putrefaction, etc., are described as means of getting rid of effete matter and reconverting it into harmless or useful products, and attention is drawn to the necessity of preventing putrefaction in or near dwellings, though it would be folly to attempt preventing it altogether.

The disposal of sewage is gone into pretty fully, the various methods of dealing with it which have been tried or proposed, being described, and tables given showing the results in each case. The author at once condemns simple irrigation, on the ground that there would not be land enough available to deal with all the sewage produced, and after reviewing the various methods of precipitating with lime, ferrous sulphate, etc., describes one which he has patented, which consists in using powdered coke as the precipitating agent. This, he says, has the advantage of producing a deposit which can be more easily separated and dried, and which can be then used either as manure, as fuel, or for making bricks.

The cause of infectious diseases is discussed at some length, the generally received theories being explained, with the arguments for and against each. Some of the objections to the germ theory put forward seem rather strained, as for instance when it is asserted that we cannot have an attenuation of the strength of a microbe without a process of evolution by which it is morphologically changed into an innocuous form. In fact the impression left on the reader by this section is that the germ theory rests on a very weak basis and that Dr. Lionel Beale's theory of the degradation of bioplasm is to be preferred, although in the subsequent section the author apparently assumes the correctness of the germ theory, *i.e.*, that diseases of the zymotic class are due to toxic substances produced by the life action of microbes. In face of recent researches this conclusion can scarcely be avoided.

The remainder of the book is mainly devoted to proclaiming the virtues of "Sanitas," and its superiority over all other disinfectants; the following extract is an example:—

"There is one great danger in the practice of antiseptic surgery, although it is by no means unavoidable, and that is the possibility of poisoning patients by the absorption of noxious antiseptics. Iodoform, subnitrate of bismuth, and corrosive sublimate exhibit very powerful toxic effects, and many hundreds of lives have been lost by the employment of carbolic acid; but now that there are better antiseptics known to science, such as Sanitas, which is non-poisonous, the necessity for using poisonous antiseptics no longer exists, and their employment by unscientific persons is to be condemned in the strongest possible terms, since it unnecessarily exposes suffering humanity to danger of life and limb from their toxic effects."

We then learn that in the opinion of the author, "Sanitas fumigators," "Sanitas soap," "Sanitas emulsion," etc., are to be preferred in all possible cases, and in reference to Sanitas "Bactericides," we are told that "one of these solutions contains 5 per cent of mercuric chloride and 5 volumes peroxide of hydrogen, and they are so combined that unlike ordinary solutions of mercuric perchloride (*sic*) alone, the preparation does not coagulate albumin, the advantage being that its antiseptic character is not impaired when placed in contact with mucous membranes and other tissues."

The concluding chapter contains a good deal of information about the various eucalypti and the oils yielded by them, this section being mostly compiled from papers which have appeared in this Journal.

The style is often somewhat loose, as when we are told that water (no amount stated) "absorbed about 4 or 5 c.c of ozone," or that "it is to the presence of this gas (CO_2) that part of the so-called hardness of water is due." Of course anyone with a previous knowledge of chemistry will understand what is meant by this, but the book is intended for others than chemists, and most of them would be misled by it.

The same thing is noticeable in the tables of ab sorption of oxygen by turpentine, where pounds and grams are mixed up together, and results are given in "grams of H_2O_2 per 1 pound oxygen absorbed."

* London: Baillière, Tindall and Cox. 1888. Demy 8vo. Pp. i–xii., 1–439.

ANSWERS TO CORRESPONDENTS.

Dispenser.—We are not quite sure as to the purport of your question. If you refer to the qualification for registration as a chemist and druggist, this can only be obtained by passing the examinations required by the Pharmacy Act, 1868, a synopsis of which may be obtained on application to the Registrar, 17, Bloomsbury Square, London.

Mr. E. A. Barber, chemist and druggist, at present resident in Pau, France, is desirous of disclaiming identity with the person bearing the same name who is concerned in the legal inquiry being held at Walthamstow.

Pharmacist wishes to publish a caution respecting the practice of a female who in making a purchase tenders a coin considerably in excess of its value, and afterwards disputes the amount of change received.

Tamar Ostium.—The articles mentioned do not appear to be described.

E. R. S.—*Sulphur vivum* is an impure form of sulphur. According to Gray's 'Supplement' impure native sulphur was formerly brought from Sicily under this name. The residue left in the subliming pot after purifying sulphur by sublimation is said to have been substituted for it, and sometimes a mixture of flowers of sulphur and lamp black.

Beta.—Apply to the Secretary of the Apothecaries' Company.

White Emulsion.—S. S. Linnett asks for a receipt for a white emulsion for cattle oils that will keep its colour.

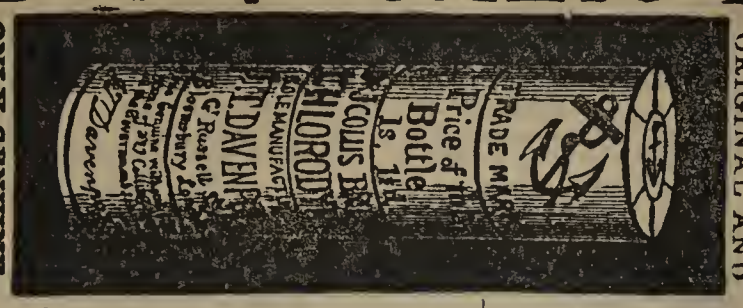
Inquirer.—The Bill has not been withdrawn, but the second reading is set down for an early day after the reassembling of Parliament.

Indignant should send information as to breaches of the law to the Registrar.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Wright, Medicus, Pharmacist, Dispenser, E.R.S.

THE ORIGINAL AND ONLY GENUINE.

DR. J. COLLIS BROWNE'S CHLORODYNE

ONLY GENUINE.  ORIGINAL AND

IS THE GREAT SPECIFIC FOR CHOLERA, DYSENTERY.

COUGHS, COLDS, ASTHMA, BRONCHITIS.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Dr. J. C. BROWNE (late Army Medical Staff) DISCOVERED a REMEDY to denote which he coined the word CHLORODYNE. Dr. Browne is the SOLE INVENTOR, and, as the composition of Chlorodyne cannot possibly be discovered by Analysis (organic substances defying elimination), and since the formula has never been published, it is evident that any statement to the effect that a compound is identical with Dr. Browne's Chlorodyne *must be false*.

This Caution is necessary, as many persons deceive purchasers by false representations.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Vice Chancellor Sir W. PAGE WOOD stated publicly in Court that Dr. J. COLLIS BROWNE was UNDOUBTEDLY the INVENTOR of CHLORODYNE, that the whole story of the defendant Freeman was deliberately untrue, and he regretted to say it had been sworn to.—See *The Times*, July 13th, 1864.

DIARRHŒA, DYSENTERY.

GENERAL BOARD of HEALTH, London, REPORT that it ACTS as a CHARM, one dose generally sufficient.

Dr. GIBBON, Army Medical Staff, Calcutta, states: "2 DOSES COMPLETELY CURED ME of DIARRHŒA."

From SYMES & CO., Pharmaceutical Chemists, Simla. *Jan.* 5, 1880.

To J. T. DAVENPORT, London.

DEAR SIR,—We congratulate you upon the widespread reputation this justly-esteemed medicine has earned for itself all over the East. As a remedy of general utility, we much question whether a better is imported, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances *ad infinitum* of the extraordinary efficacy of DR. COLLIS BROWNE'S CHLORODYNE in Diarrhœa and Dysentery, Spasms, Cramps, Neuralgia, the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than Collis Browne's, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than Collis Browne's is a deliberate breach of faith on the part of the chemist to prescriber and patient alike.—We are, Sir, faithfully yours, SYMES & CO., *Members of the Pharm. Society of Great Britain, His Excellency the Viceroy's Chemists.*

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THE ORIGINAL AND ONLY GENUINE.

IMPORTANT DECISIONS.

Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

FURTHER IMPORTANT NOTICE.

The subjoined list of eminent Firms concur with Vice-Chancellor Sir W. Page Wood's statement in Court that Dr. Collis Browne was undoubtedly the Inventor of Chlorodyne; and that when Chlorodyne, or the Original Chlorodyne, is ordered, they invariably supply Dr. J. Collis Browne's:—

Apothecaries' Hall	London.	Frazer & Green	Glasgow.	Morson, T., & Son	London.
Allen, Hanbury & Co.	,,	Gale & Co.	London.	Newbery & Sons	,,
Baiss Brothers	,,	Giles & Son	Clifton.	Oldham, G., & Co.	Dublin.
Banks & Richards	Birmingham.	Goulding, Messrs.	Cork.	Parsons & Richardson	Leicester.
Barron, Harveys & Co.	London.	Grattan & Co.	Belfast.	Peake, Allen & Co.	Dublin.
Bell, John, & Co.	,,	Grimwade, Ridley	London.	Raimes & Co.	Edinburgh.
Corbyn & Co.	,,	Grindley & Son	Chester.	Sang & Barker	,,
Cox & Gould	,,	Hearon, M'Culloch & Co.	London.	Sanger, J., & Sons	London.
Curling & Co.	,,	Hodgkinson, Tonge & Stead	,,	Sim, James, & Co.	Aberdeen.
Davy, M'Murdo & Co.	,,	Hopkins & Williams	,,	Smeeton, W.	Leeds.
Dobbin, W., & Co., Limited	Belfast.	Hovenden, R., & Sons	,,	Southall & Co.	Birmingham.
Drew, Barron & Co.	London.	Johnson, J. H. & S.	Liverpool.	Sutton, W., & Co.	London.
Drew, B., & Alexander	,,	Langton, W., & Co.	London.	Tomlinson, Hayward & Co.	Lincoln.
Dunn & Company	,,	Lynch & Co.	,,	Treacher, Hodgkinson & Co.	London.
Edwards, W.	,,	Mackay, John, & Co.	Edinburgh.	Westwood & Hopkins	,,
Evans, Lescher & Webb	,,	Mander, Weaver	Wolverhampton.	Woolley, James	Manchester.
Evans, Gadd & Co.	Exeter.	Marsden & Sons	London.	Wyleys & Brown	Coventry.
Ferris & Co.	Bristol.	Maw & Son	,,	Yates & Co.	London.
Foulger, S., & Son	London.	Meggeson & Co.	,,		

After these public statements in a Court of Equity, and subsequent confirmation by the trade at large, no Chemist can conscientiously use or sell any other compound for Chlorodyne, without committing a breach of faith, unjust to patient and physician. The *value* of the remedy *alone* creates the great demand.

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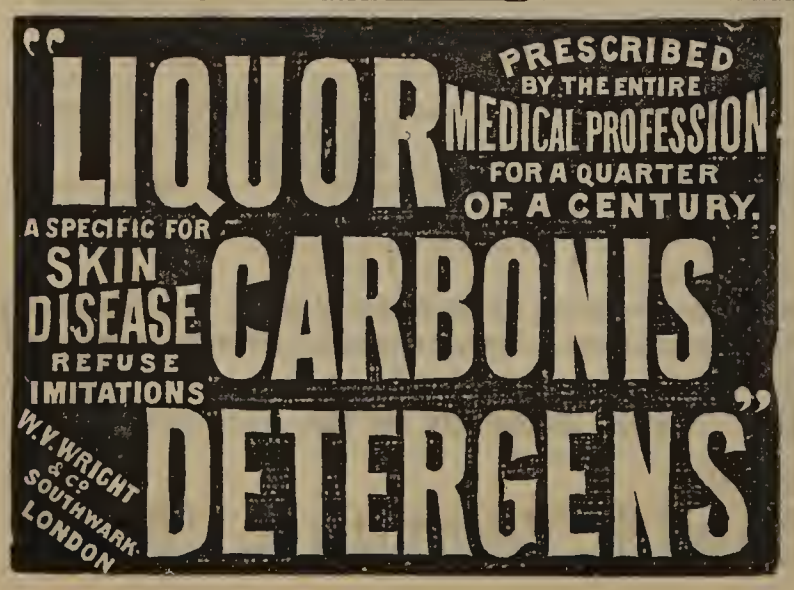

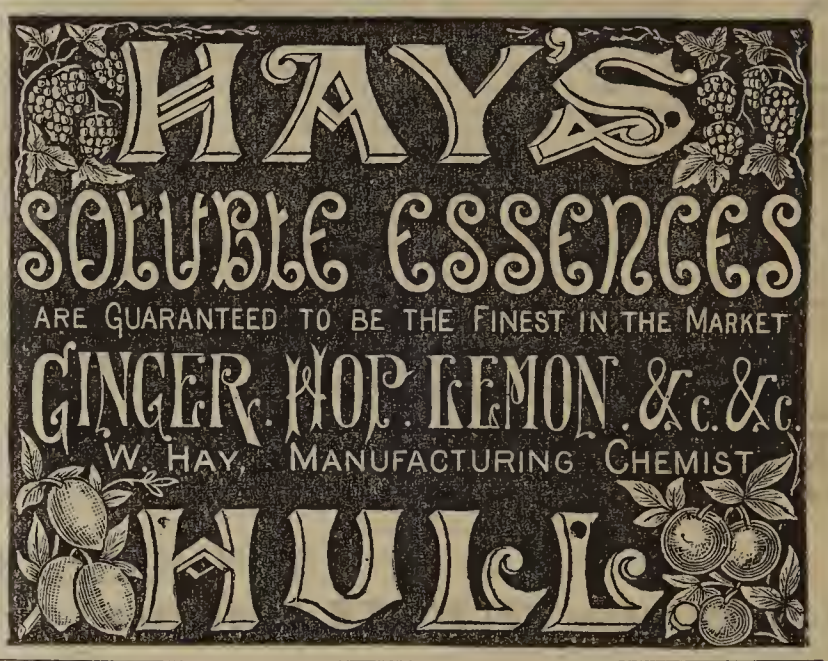

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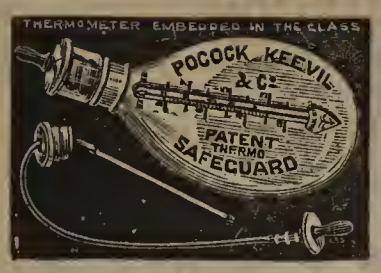

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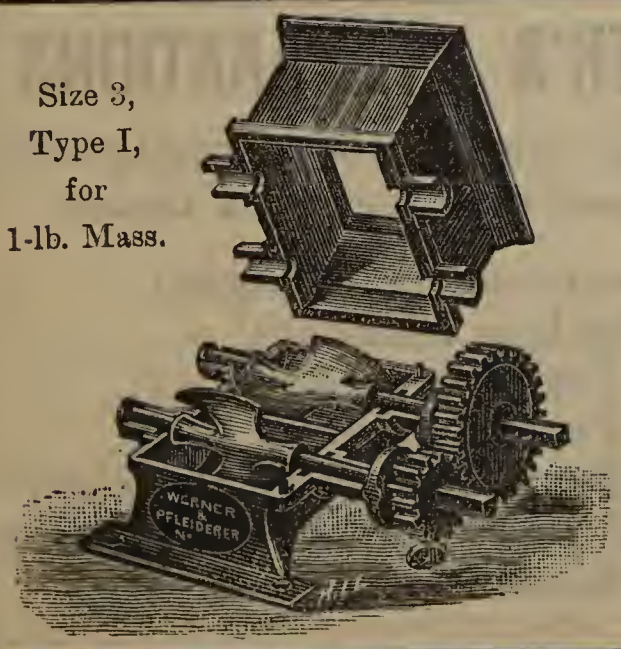

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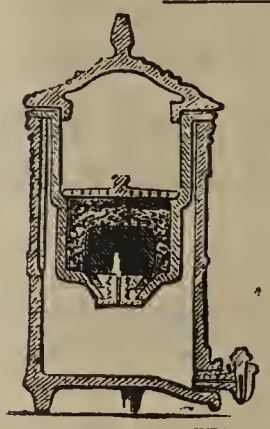

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ASSISTANT. Age 22. Minor qualification. 6 years' experience. JOE THOMAS, Garstang.

DISPENSER to a Surgeon, or ASSISTANT to a Chemist. Age 33. Good references. J. OSTLER, 71, Trafalgar Rd., Greenwich.

JUNIOR, in good Dispensing business. Age 19. Height 5ft. 8in. At liberty Sept. 6th. First-class references. Address, S. W., 5, Howard St., Strand, London.

ABOUT Oct. 1st.—Out-doors. PART-TIME, in London or large town. Accustomed to good class Dispensing and general Retail. Qualified. Age 27. Height 5ft. 11in. Good references. QUININE, 98, Albany St., N.W.

AS ASSISTANT. Age 28. Height 5ft. 10in. Experienced in Prescribing, Dispensing and Light Retail. CARDAM, 113, Albert St., Regent's Park, N.W.

TEMPORARY or MANAGER. Good experience, Prescribing, Dispensing. W., 31, Russell Ter., Leamington.

UNTIL October 1st. As DISPENSER or LOCUM. Minor. F. T., 135, Peascod St., Windsor.

JUNIOR. 21. Good Dispensing business. Near London preferred. 5 years' experience. Disengaged September 17. W. P., 1, Surrey Pl., Norwich.

MANAGER or Senior ASSISTANT. Out-door. Good experience. Town or country. J. H., care of Messrs. Wright, Layman & Umney, 50, Southwark St., S.E.

LOCUM TENENS. Qualified. Town and country experience. Disengaged. MINOR, 3, Whitmore Rd., Small Heath, Birmingham.

TEMPORARY. Town or country or permanent Out-door, London. Qualified. At liberty. STATIM 151, Nevill Rd., Stoke Newington.

TEMPORARY.—6 or 7 weeks. Town or country. 8 years' experience. Good references. B., 27, Clarendon Rd., Croydon.

AS MANAGER or otherwise. Age 29. 14 years' experience. Major qualification. MAJOR, care of Mr. M. Howell, 61, High St., Peckham, S.E.

JUNIOR. 21. Good reference. Height 5ft. 10in. Used to good class business. ALPHA, 133, High St., Stockton.

IN October.—JUNIOR, in good Dispensing and Light Retail business, just finishing apprenticeship. OWEN, 25, King St., Carmarthen.

MINOR. Experienced Dispenser and Counterman. Ætat 24. Good appearance and address. Disengaged. STATIM, Manor House, Queenhill, Tewkesbury.

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ASSISTANT. 22. In or near London preferred. 7 years' experience. DELTA, 24, Erskine St., Liverpool.

JUNIOR. 22. Well up in Prescribing, Tooth Extracting. BETA, 40, Bolsover St., W.

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TEMPORARY or PERMANENT. Good references and experience. Age 28. Height 5ft. 10in. F. H., 3, Gloucester Terrace, Newbury.

OUT-DOOR ASSISTANT or MANAGER. 13 years' experience. Highest references. Age 28. Hants or Berks preferred. Disengaged September 7th. W. F. T., 49, Castle St., Salisbury.

LOCUM or PERMANENCY. 20 years' experience. Good Extractor, Prescriber and Dispenser. Abstainer. KINO, 86, Burnley Rd., Padiham, Lanc.

ASSISTANTS WANTED.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

BRADFORD FRIENDLY SOCIETIES MEDICAL AID ASSOCIATION.—Wanted immediately. A DISPENSER of Medicine will be required to devote the whole of his time to the business. Wages 30s. per week. Applications, stating age, whether married or single, together with recent testimonials, to be sent to the Secretary on or before August 22nd, 1888. D. J. SLOANE, Secretary, 18, Clarendon St., Manningham, Bradford, Yorks.

A JUNIOR ASSISTANT, in-doors, with good provincial experience. Must be a neat and accurate Dispenser, and well up in the business. First-class references and testimonials. State age, height, salary, and enclose photo. CHAVE & JACKSON, Pharmaceutical Chemists, Hereford.

PARIS.—Wanted a qualified ASSISTANT, with good references and address. He must write and speak French well. Apply, first by letter with all particulars, to T. P. H., at Mr. Squire's Library, 49, The Broadway, Ealing, near London.

IMMEDIATELY.—An ASSISTANT, not under 23, who must be a reliable Dispenser, accustomed to first-class Retail, and have unexceptionable references. One only kept. In-doors. A permanency. Address, with all particulars as to salary, height, experience, &c., enclosing carte, to C. WESTON, Pharmaceutical Chemist, Ventnor, I. of W.

EARLY in September, in old established business, S. W. district, young man of good appearance and address. Part-time in lieu of salary, or small salary to Improver. He will have experience in every branch, and be treated as one of the family. Reference indispensable. M. N., Barron Harveys, Giltspur St., E.C.

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ASSISTANTS WANTED.

COMPETENT ASSISTANT. Out-door. Must be an accurate Dispenser, good Counterman, and accustomed to a country business. State salary, age, height, references, with carte, to J. W. NEWTON, Chemist, Salisbury.

DISPENSER and BOOK-KEEPER wanted by a firm of Surgeons near London. Must have had experience with medical men. Address particulars, F. A. S., care of Messrs. Corbyn & Co., 300, High Holborn, W.C.

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R. WRIGHT, Pharmaceutical Chemist, Buxton, has a vacancy for a well educated Youth as APPRENTICE. Must have passed the Preliminary.

LOCUM TENENS for a Public Institution, to take charge of the Dispensing for about a fortnight. State terms and give references to BRADLEY & BLISS, Reading.

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CHEMIST and Dentist, removing to private house and confining himself to Dentistry, has well fitted SHOP for disposal at valuation of stock and fixtures. Good house, low rent. Will teach purchaser Dentistry and assist him for mutual advantage. Good opportunity for energetic man of limited capital. Address, DENTIST, Goodall, Backhouse, Leeds.

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A LIGHT Retail, Dispensing and Prescribing Business, in centre of market place in a pleasant and rapidly increasing suburban district. Shop double fronted, well fitted and stocked. House convenient with small garden. Average returns for last 3 years about £490 per annum. Rental £45. Price £300, or without stock £200 Mr. Young, Chemist, 9, Upper Market Pl., Leyton, Essex.

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£400.—Old-established Chemist's Business' with immediate possession, at 14, Denman St., Radford, Nottingham, in consequence of the death of the late proprietor (J. T. Jenkins). Very commodious premises. Splendid opening for an energetic man, with small capital. For full particulars apply to above address.

15 MILES from London.—Totally unopposed good class Retail, Dispensing, and Prescribing Business, making a net profit of £250 a year after paying all expenses, and capable of doing much more by personal attention. Rent £35. Long lease. Price £500, for which there is value in stock and fittings. Strictest investigation. Traveller, Beaulieu Villa, Green Lanes, Finsbury Pk.

ISLE of Thanet, Kent.—In a fashionable seaside resort. Good class Retail, Dispensing and Prescribing Business. Returning £700. Handsomely fitted shop. Good house. Excellent position. Capable of doing £1000. Price £600, or first reasonable offer. Apply to X. Y. Z., Messrs. Berdoe & Co., 30, Jewry St., Aldgate, London.

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EASY terms.—Genuine East-End Retail and Prescribing Business. Small, but very profitable. Returns last year £8 weekly; now under manager. Full information to bona fide purchaser. Spes, Hearon Squires, 5, Coleman St., E.C.

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BUSINESS FOR DISPOSAL.

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AS Manager, with view to Partnership and ultimate succession, in a good sound business. Locality no object. Business not objected to that has been neglected, and from which owner wishes to retire. Highest references. Replies, in strict confidence, to Chemist, care of Mr. Bunn, Brading, Isle of Wight.

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VALUATIONS.—It is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.

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Vendors of good class Concerns can be at once supplied with Partners or Buyers, as F. J. Brett has buyers prepared to invest from £1500 to £3000.

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5. LIVERPOOL ...	,,	850.	,,	50.	,,	600.
6. LONDON, S.W.	,,	620.	,,	60.	,,	525.
7. SUNDERLAND	,,	500.	,,	50.	,,	400.
8. BIRMINGHAM	,,	500.	,,	40.	,,	300.
9. CLAPHAM ...	,,	400.	,,	40.	,,	200.
10. WEST BROMWICH	,,	400.	,,	50.	,,	250.
11. GUERNSEY	,,	385.	,,	40.	,,	300.
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Some of above, newly established, increasing rapidly.

To Chemists' Fitting up or Making Alterations.

FOR Sale.—The entire new Fittings of Two Chemists' Shops, £45 and £67, including Drawers, Shelving, Counters, Dispensing Screen, Desk with Case before, bent front Counter Case, Window Enclosure, Carboys and Stands. Carriage paid. We have the largest stock of Chemists' Fittings in Provinces, of modern design and good workmanship, at first cost. Designs and estimates furnished, and workmen sent to all parts of the country. RICHARD TOMLINSON & SONS, Bond St., Constitution Hill, Birmingham.

RARE chance through ill-health.—To be Let, a handsomely fitted and well stocked lock-up Chemist's Shop, returning, under manager, £400. Conspicuous corner in main road, S.W. Owner is leaving for the country, and will remove fixtures, or sell at valuation. Rent £40. Mr. PARRY, 158, Lavender Hill, S.W.

The Pharmaceutical Journal
HAS A
Guaranteed Circulation of 7000 Copies Weekly

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N.B.—No Charge to Purchasers.

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5. £600.—HANTS. Retail and Prescribing BUSINESS. Returns about £600, with good profits. House in good condition. Rent £35 only. Price £450. Vendor held the business 10 years. Trial allowed if wished.
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Personal applicants receive Messrs. O. & Co.'s direct attention and advice, where required, free.

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BESIDES MANY AWARDS AT PREVIOUS EXHIBITIONS.

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Because they are of the very best quality, and are put up most attractively, special samples and circulars being supplied for distribution.

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The quality of the Soap, its handsome appearance and delightful perfume, make it sell on sight, while the distribution of the samples brings the customers promptly to the chemists who send them out.

See letter, "The Bright Side," in THE CHEMIST AND DRUGGIST, Nov. 5, 1887, p. 590; also Nov. 12, 1887, pp. 611 and 624.

Note opinion of THE CHEMIST AND DRUGGIST, Sept. 17, 1887.

A NEW SOAP.—The soap trade of chemists has greatly dimlnished, and has almost vanished so far as the lower qualities are concerned. The only chance for maintaining the returns from this department is to place novelties of a high-class character before customers, and we should think that there will be considerable satisfaction in introducing the Cashmere bouquet soap made by Messrs. Colgate & Co., of New York. This is a cream-coloured soap in oval tablets; it is remarkably pure and high-scented, and is put up in neat half-dozen boxes, with several elegant and artistic show cards. The agents, Messrs. Burroughs, Wellcome & Co., inform us that a liberal supply of sample tablets (one-fourth the regular size) are presented to the retailer, so that sales may be facilitated. It is the favourite soap in the "States."

THOUGH NOT A CHEAP SOAP,

Quality considered, Colgate's Cashmere Bouquet Soap is the best value in the market. It is made from a special stock which is not employed by any other soap maker in the world. Being fully matured *it lasts longer* and lathers as well as any fancy soap in the market.

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Until further notice, with each dozen of Colgate's Cashmere Bouquet Soap ordered of us, or through the wholesale houses, we will supply 1 doz. samples for free distribution if a request for same be made on order. The samples are one-fourth the size of the regular soap and are much appreciated by all who receive them.

With large orders we will supply special circulars to accompany samples bearing chemist's name and address only. Colgate's Cashmere Bouquet Soap has the largest sale of any superfine toilet soap.

Price, retail, 1s. 3d.; per dozen, 10s.; per gross, 110s. nett.

ORDER AT ONCE. IT WILL PAY YOU TO DO SO.

COLGATE'S
Cashmere Bouquet Perfume.

This exquisite odour, like that of the soap, is as distinctive as it is delicate and lasting. It is exceeding popular with the *élite* of society wherever it becomes known.

Prices: 1 oz., 2s. 6d. retail; 22s. doz.; 21s. 3d. doz. in gross lots.
2 oz., 4s. retail; 30s. 9d. doz.; 29s. 7d. „ „ „

Also supplied in bond at special rates.

COLGATE & CO., 67, Holborn Viaduct, London, E.C.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 948.] SATURDAY, AUGUST 25, 1888. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

SPECIAL NOTICE.

The Society's Libraries and Museums in London and Edinburgh will not be open in the evening during August and September. The Library and Museum in London will be closed during the first fortnight in September. The Library and Museum in Edinburgh will be closed from August 20th to September 4th, both dates inclusive.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society, of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

There are at present *forty-nine* annuitants, receiving £1670 per annum, and casual relief is also granted, amounting in 1887 to nearly £500. The total expenditure in 1887 was £2375.

The following is the scale of pensions :—

£30 per annum to pensioners under 65 years of age, and £35 per annum to pensioners 65 years of age, and upwards.

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BY PROFESSOR ATTFIELD.

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BY PROFESSOR GREEN.

The Lectures will begin on Friday, October 5th, at 9 a.m., and be continued on the last two days of each week.

MATERIA MEDICA.

Demonstrations will be given by Mr. E. M. Holmes, the Curator of the Museum, on Thursdays, at 10 a.m., commencing on October 4th.

PHARMACY AND PRACTICAL PHARMACY.

Lectures and Demonstrations will be given every week by Mr. Joseph Ince, on Tuesdays, Thursdays and Fridays, at 5 p.m., commencing on October 2nd. Laboratory work in Practical Pharmacy will be carried on from 3 to 6 p.m. on Mondays and Wednesdays.

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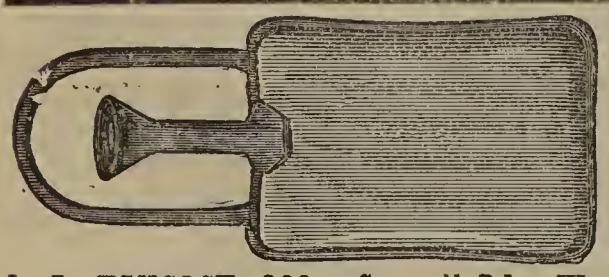

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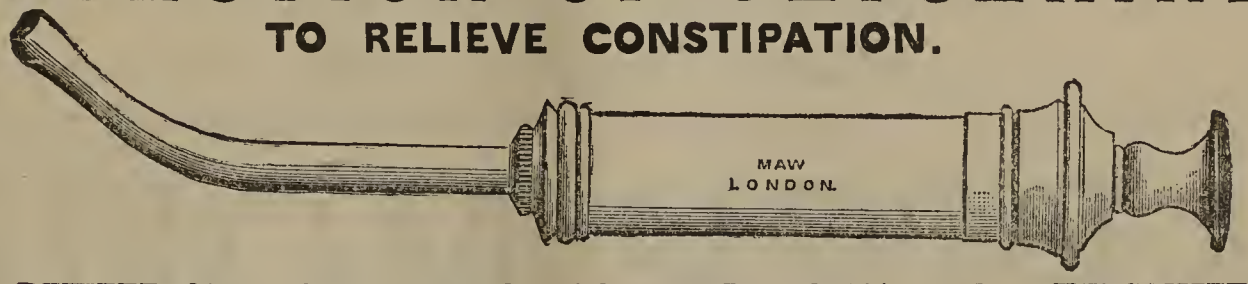

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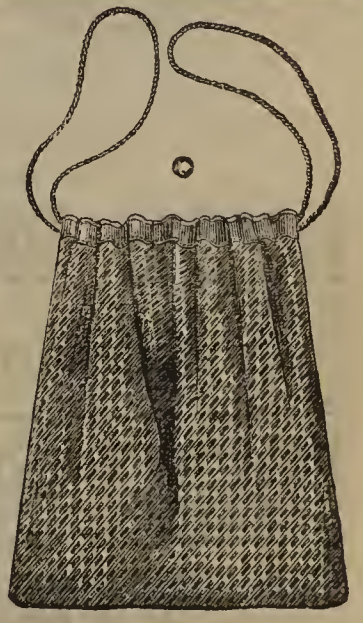

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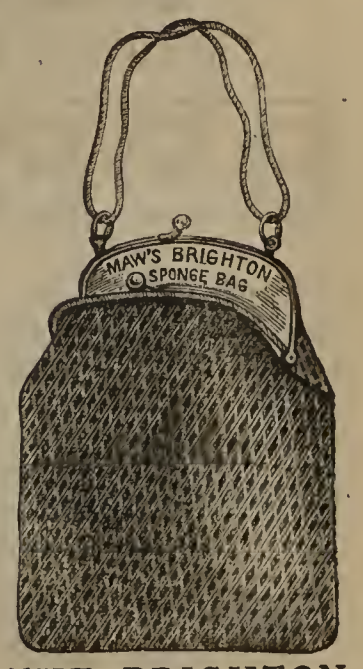

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SPECIAL PRICES ON APPLICATION.

THE GLASGOW EXHIBITION.

(*Concluded from page* 104.)

The coal-tar derivatives used for dyeing and printing certainly bear away the palm from among the chemical compounds, for wealth and beauty of display—as well as for puzzling nomenclature. The arbitrary trivial names associated with them reveal very little except to the initiated as to the chemical nature of the substances to which they are applied, and even when the systematic chemical names are ascertained probably few will be the wiser. It would be quite out of place in this report to attempt to deal in detail with this complicated subject; but it may be mentioned that anyone wishing for information respecting the chemical constitution of these compounds will do well to obtain a copy of a pamphlet issued by Bayer and Co., of Elberfield, and of another giving particulars as to the products exhibited by the Basle Chemical Manufacturing Company, whose agents are Arthur and Hinshaw, of Glasgow. As Glasgow has for a long period been associated with the business of Turkey red dyeing, it is not surprising that alizarin and its allied compounds, which have pushed garancin from its throne and extinguished madder cultivation as an industry, should be well represented. It is satisfactory to find that the manufacture of these compounds has not been entirely transferred to the Continent. One of the most handsome and instructive displays is that of the British Alizarin Company of Silvertown, London (No. 741), which, besides specimens of the raw materials, includes a beautiful crystallization of anthracene, the first definite compound in the series, in silvery scales; anthraquinone, the intermediate product obtained by oxidation of the anthracene, in long brilliant yellow needles; and the red crystals of alizarin. There are also the dichlor and dibrom derivatives of anthracene, as well as anthrapurpurin, flavopurpurin and many others. A brilliant show of dyed and printed fabrics illustrates the practical applications of these compounds. One little group in this case is most interesting, since it includes a block of coal about $8 \times 8 \times 5$ inches, and resting upon it, enclosed in small stoppered bottles, the amount of crude anthracene obtainable from it by distillation, the intermediate anthraquinone, and finally the alizarin, which is represented as being sufficient to dye one square yard of Turkey red cloth. Other British firms that make very creditable shows of a large number of raw materials and manufactured alizarin products are Sadler and Co., of Middlesborough (No. 740); and Hardman and Holdens, of Miles Platting (No. 748), who illustrate the application of alizarin to the dyeing of wool, as well as of silk and cotton, and show some very fine specimens of tri- and tetra-bromanthracene in lemon-coloured needles, carbazol in long needles, purpurin as a crimson crystalline powder, and acridine hydrochlorate in brown spangles. Sadler and Co. also show "Bismarck brown," a derivative from dinitrobenzol, magenta and other aniline compounds. Similar alizarin compounds are, of course, exhibited by foreign firms, whilst the aniline compounds industry seems to be practically in their hands. Bayer and Co. show magentas, violets, blues, greens, safranines, vesuvines, scarlets, croceines, chrysamine, heliotrope, benzopurpurine and many more, capable apparently, without further additions, of producing every gradation of tint. A similar remark applies to the case of the Basle Chemical Manufacturing Company. One feature in this case is the beautiful series of fluoresceine compounds, and the specimen of fluoresceine in ammoniacal solution, with its strong green fluorescence, the solution of dichloranthracenesulphonic acid, with its blue fluorescence, and some other solutions that are shown, may suggest to enterprising pharmacists who may see them a possibility of innovation in the colouring liquids for their carboys. In this case was also noticed an exhibit labelled "phenylhydrazine," which consisted of white crystals in a yellow liquid. In the case of Kühn and Schröder (No. 742) may be seen indophenol, gallocyanine, "muscarine," a "Basle blue" and a very pretty "fast myrtle." French coal tar pigments are represented in a handsome exhibit belonging to the St. Denis Dyestuff and Chemical Company.

Notwithstanding the aggressive position taken by the coal tar derivatives, the old-fashioned pigments are not altogether driven out of the field, and some of the exhibits of these include substances having special interest for pharmacists. For instance, the case of Arthur and Henshaw, of Glasgow (No. 739), besides cubes of different varieties of indigo, madder, and various "extracts" from dyewoods, contains "black," "grey" and "silver" cochineal; turmeric in "fingers" and bulbs; "finger," "cube" and "flat" gambier; cutch; myrobalans; several varieties of galls, including the Greek, Bussorah, "blue" and "green" Smyrna, and the curiously-shaped Chinese; as well as different gums. Milnes Brothers, of Bury, Lancashire, exhibit dyewood extracts and liquors, natural pigments used in dyeing and calico printing, and tannin substances used as fixing agents, as well as the raw materials from which they are obtained. Here may be seen Persian berries extract, with silk dyed a beautiful yellow with it; red quebracho wood, which for a short time held a place in medicine; larch bark, rhamnin, etc. But what will to many be thought the most interesting collection of vegetable dyes will be found in quite another part of the building—Court 15—in an exhibit of Mrs. Ellice, of Glengarry, of products of the Highland hand-loom from native wool dyes and spinning (No. 1026). It includes specimens of the following native dyes prepared and used in the Highlands of Scotland from time immemorial. Heather with alum, giving dark green; crottle lichen (*Parmelia saxatilis*), yellowish brown; crottle cortzir (*Leconora Tartarea*), scarlet or crimson; common yellow wall lichen (*Parmelia parietina*), brown; rock lichen (*Ramalina Scopulorum*), red; white crottle (*Lecanora pallescens*), red; limestone lichen (*Urceolaria calcarea*), scarlet; dark crottle (*Parmelia ceratophylla*), brown; whin bark (furze), green; dulse, a seaweed, or duilisg, "the leaf of the water," brown; "shillister" (*Iris*) root, black or grey; alder, black; soot (from peat), dirty yellow; blaeberry, with alum, blue; blaeberry, with nut galls, dark brown; blaeberry, with alum, etc., purple red; elder, with alum, blue; privet, ripe berries, with salt, scarlet red and green; euonymus (spindle tree burning bush), purple; currant (common burning bush), with alum, brown; apple tree; ash and buckthorn, also poplar and elm, yellow) broom (common), lively green; rue (*Galium verum*, or ladies' bed straw, fine red; roid, or bog myrtle, yellow; dandelion, crimson; wild cress, violet;

carmeal (*Braoom Fraoich*), violet; root of common dock, finest black; root of ash tree, yellow; tormentil (also used for tanning), red; St. John's wort, rich yellow; teasel, yellow; wild mignonette, green; bracken root, yellow; bramble, dark orange; sundew (*Drosera rotundifolia*), purple; and sundew, with ammonia, bright yellow. Whilst thus referring to cases that contain incidentally articles included in the vegetable materia medica mention may be made of the exhibit of Martyné and Co., of Glasgow, in Court 26 (No. 1374), which among other foreign products includes a number of samples of opium from different districts, for example, Malatia, Salonica, Bogaditz, Yerly, Ghéivé, Carahissar and Adette.

Other instances of products that are being displaced to a considerable extent by substitutes of mineral origin are found in the animal and vegetable oils. These are however still well represented in the case of MacArthur and Jackson, of Glasgow (No. 729), which contains fine samples of seal, menhaden, cod, whale, sperm, lard, neatsfoot, colza and olive oils. There is also a sample of "sperm oil substitute," which, however, betrays its origin by its "bloom" or fluorescence. Indeed this feature seems almost inseparable from the rosin and mineral oils, for although J. O. Sandeman, of Glasgow (No. 728), exhibits some fine-looking "bloomless" oils, it is only relatively, strictly speaking, that this term is applicable to them. Mineral lubricating oils obtained from Russian crude naphtha are exhibited by Crichton's Oil House, of Newcastle (No. 758), and Oehlrich and Co., of Baku (No. 1364). It is claimed that the lubricating oils manufactured from the Baku petroleum possess, as compared with all other mineral oils, a greater viscosity and the advantage of not congealing even if exposed to a severe frost. However this may be it would appear that the Russian mineral oils, both for lubricating and burning, have attained a considerable consumption in this country. The last-mentioned firm, in addition, manufactures the soft and hard form of the paraffin hydrocarbons which are now official in several pharmacopœias. The Crichton Oil House shows also a very white "crystoleum petroleum." There are several other exhibits of lubricating and burning oils, among which may be mentioned that of Young's Paraffin Light and Mineral Oil Company (No. 777), showing the products and bye-products from the distillation of Scotch bituminous shale, and that of the Pumpherston Oil Company (No. 792), who distil the Pumpherston shale.

Before referring to some of the food products and allied substances, mention may be made of a most interesting case that will be found planted in the midst of the chemical exhibits in a manner provocative of the query usually associated with the "fly in amber." It contains a collection brought together by Professor M'Intosh, of St. Andrew's University and the Marine Laboratory, of the eggs and young of the food fishes. Here may be seen the salmon, cod, haddock, flounder, sole, ray and other fishes in the earlier stages of development. The flounder of a day old appears as a mere speck, but by the time it has attained an inch in length it is quite a shapely little fish, and it is very curious to recognize in these minature forms such distinct representations of potential supplies for the table. In addition to the developmental stages of the salmon its internal and external parasites are illustrated.

Mustard and starch are represented in the case of J. and J. Colman, of Norwich (No. 736), and this well-known firm issues as a souvenir of the exhibition a pamphlet which contains some interesting information respecting these products. For the derivation of the name mustard the firm favours the suggestion that refers it to a partially obliterated inscription over the city gate of Dijon, "*Moult* [*me*] *tarde*," which is said to have been adopted with the city arms as a trade mark by the Dijon mustard makers of the fourteenth century. It may be remarked, however, that the Latin "*mustum ardens*," said to have been applied to a beverage made by digesting sinapis seed in new wine, seems to have a prior claim. The best qualities of the sinapis seed used in the preparation of the well-known condiment are English grown, principally in Lincolnshire, Yorkshire, Cambridgeshire and Essex, but a fair proportion is imported from Holland. The great "mustard fair" is held at Wisbech in October, but large quantities are also sold later at Selby and Hull. The crop is very exhausting to the soil, and requires heavy manuring, the average yield being about three quarters per acre. The seed, after being dried in a kiln and cleansed in a kind of dressing machine, is first crushed between rollers and then pounded by gigantic pestles, worked similarly to the stamps in ore-crushing machines. In order to separate the bran the greenish powder is run into sieves of silk lawn fixed in frames maintained in continuous agitation by the action of eccentric wheels, from which it falls in a shower, appearing to the superficial observer of a bright yellow colour and free from husk. But after passing through another series of sieves having three hundred strands of silk to the square inch it appears still brighter in colour through the removal of more bran. It is then ready for blending, the proportions of brown and white flour used being regulated according to the quality of mustard required, and it is pointed out that the less expensive white flour, although indispensable in certain proportion in order to bring out the full pungency of the brown flour, may be added in such quantity as to render the product of very inferior quality although still a "genuine" mustard. On the other hand the flour of brown mustard is considered to be much too pungent for the palate of the majority of customers, and to require dilution; but for this purpose, instead of white mustard flour, the Norwich firm uses fine wheaten flour. The separated bran, after being submitted to a further grinding, and the resulting powder heated in steam-jacketed cylinders, is pressed to remove the fixed oil and the residual cake is disposed of as manure. The starch prepared by this firm is said to be obtained entirely from rice, chiefly grown in the Bengal and Madras Presidencies. In the case may be seen a sample of a buff-coloured product, intended for the "starching" of *écru* curtains.

Sugar refining, notwithstanding the fierceness of foreign competition aided by a system of "bounties," still survives as an industry in the neighbouring town of Greenock, from whence J. Walker and Co. send a fine assortment of raw and refined cane and beetroot sugars, together with specimens of the impurities removed in the process of refining, includ-

ing even the "sugar itch" insect from a sample of "Demarara" (No. 849). The conical loaves of refined lump sugar in this case appear to be unusually large, and are said to have been produced in newly patented apparatus. There are also samples of granulated sugar and syrups of various qualities. Another good exhibit of sugars is found in the case of the Sankey Sugar Company of Earlstown, Lancashire (No. 842). Here also are samples of pure and refined cane sugar, and some illustrating the intermediate stages in refining as well as the impurities removed. Probably no one who has not seen a sample of low grade sugar before being submitted to the manipulations of the refiner, will be able to realise how much is due to this process in rendering it fit for human food. This firm claims to produce sugar of almost absolute chemical purity, but this claim is hardly strengthened by the curious guarantee that all its sugars are "free from beet and all chemicals." One is puzzled as to whether or not this means that sugar from beet root is excluded. In a neighbouring case (No. 862), honey and wax, in various forms, are exhibited by E. and J. D. M'Nally, of the Borelands Apiary, Rutherglen.

Close by (No. 864) is a food product which if it justifies the claims put forward on its behalf, has probably an important future before it. It is exhibited by the Swiss Milk Company, of St. Gall, Switzerland, and consists of a powder that is represented to be composed solely of the milk solids, entirely freed from water. It is prepared in two forms, one, called "milk extract," consisting of the milk solids from which the fat has been partly removed, and the other, called "cream milk," of the solids with the fat retained and said to constitute rather over one-fourth of the whole. Upon mixing the milk extract with a suitable proportion of water it forms a liquid resembling fresh milk in appearance, though it is not everyone that will agree with the statement that it corresponds to new milk in flavour. But it may be that any defect in that direction becomes less apparent when the "milk" is combined with other liquids.

Isinglass will be found in the case of Gridley and Co., of London (No. 860), who exhibit fine samples of the varieties known as Russian, Brazilian, Penang and Bombay. Refined gelatine occurs together with calves' foot jelly, essence of rennet and similar goods in the case of J. Mackay and Co., of Edinburgh (No. 887). Liquorice cakes and articles made from liquorice are shown by Robinson and Wordsworth, of Pontefract. There are also a large number of other food and allied products of considerable interest to be seen in the Food courts; but reference to them in detail would extend this notice beyond reasonable limits.

An exception may however be made in favour of tea, not only because it is remarkably well represented in this exhibition, but also on account of the growing importance of the tea industry to the British dependencies India and Ceylon. Though tea cultivation has only been carried on commercially in the island of Ceylon during the last few years, since the excessive cultivation of the cinchona has rendered that industry unremunerative, the import of Ceylon-grown tea into this country during twelve months is said to have already reached 11,300,000 lbs., whilst the import of Indian-grown tea in the last two years has increased from 65,000,000 to 83,000,000 lbs. On the other hand there has been a corresponding falling off in the importation of Chinese tea, and this, according to a recent consular statement, is causing considerable anxiety to the Pekin authorities. Moreover, a report presented to these authorities by an expert does not appear to have been very reassuring. One inference drawn from this report and other papers by Her Majesty's Consul at Hankow is that both the Indian and Ceylon teas are better than the Chinese, although the Shanghai tea-tasters assert that China tea has naturally the better flavour. All admit, however, that the Indian teas are better grown and better prepared and that they are stronger and stand more watering. On the other hand it is claimed that China teas keep longer than the Indian, probably because they are freer from moisture, which favours fermentation. It is also alleged that "the removal of moisture means the removal of tannin, glucose and other elements," the retention of which in Indian tea renders it unwholesome, "a bogie" that is not likely to interfere much with its consumption. In the Ceylon court of the exhibition the growth and manufacture of tea is illustrated in all its stages, from the growing plant to the finished product in great variety, whilst it is only necessary to visit the Ceylon tea house in the adjoining grounds to ascertain the quality of the infusion it yields. A more cosmopolitan, and exceedingly creditable display of teas, is that of Pringle and Crichton, of Glasgow (No. 826), since it includes varieties from China, India, Ceylon, Java, Japan and Central Africa, as well as the so-called Paraguay tea (*Ilex paraguayensis*). A little pamphlet issued by this firm contains a mass of information as to the characteristics of the principal varieties of these teas, though we can only take from it a concluding quotation referring to the use of the term "pekoe," concerning which information has recently been asked for. "The qualities of tea in the several districts may be said generally to depend upon the age of the leaf. The finest is called orange pekoe, of which a certain portion is the partly-grown youngest leaf on the point of the shoot. Pekoe is the first and second leaves further down. Pekoe souchong is the third leaf. Souchong is the fourth leaf. Congou lower still. The shoots may be picked as low down as to produce the pekoe stage only, but, generally, we believe the shoot is plucked at the third or fourth leaf, and then, in process of manufacture, the several kinds are 'sorted' by sieves of various sizes."

NOTE ON THE DIGESTION OF FERMENTED MILK OR KOUMISS.

BY T. R. POWELL.

As far as I am aware no suggestion has hitherto been offered which explains the retention of fermented milk or koumiss by the stomach when all other nourishment has been rejected. The following rough experiments may perhaps throw some light on the subject, which at all events deserves more attention than it has yet received.

It is, of course, well known that if milk to which a few grains of pepsine and a few drops of hydrochloric acid have been added be gently warmed, coagulation takes place almost immediately, the casein or cheese separating in a more or less solid condition, a similar coagulation probably taking

place whenever milk is acted upon by the gastric juice of the stomach.

To render milk more digestible lime water or aerated water are often added in various proportions. Dilute therefore a portion of milk with a fourth part of aerated water and add a few grains of pepsine, when it will be found that coagulation will take place almost as quickly as in a mixture of milk and water; but the condition of the two precipitates will differ somewhat, the casein separated in the presence of carbonic acid water being in a finer state of division and therefore more readily digested. If, however, lime water be substituted for the aerated water the effect is far more decided, coagulation being delayed for some time, and the precipitate, when it at length falls being, as in the previous case, very finely divided.

Koumiss or fermented milk when freshly prepared effervesces but slightly and resembles ordinary milk; but as the fermentation proceeds lactic acid is formed, coagulation takes place, and the thick liquid becomes charged with carbonic acid. If at this stage two or three ounces be drawn off by a syphon tap and gently warmed with stirring to drive off excess of gas, there will result a thick acid fluid, thicker than milk, though an equally good emulsion; and, coagulation having already taken place in the bottle, the addition of pepsine (which dissolves more readily than in the previous experiments) causes no further precipitation, the casein being in an almost gelatinous condition.

It seems probable, therefore, that the indigestion and nausea so often produced in cases where a milk diet is desirable, are the result of the coagulation of the milk, a coagulation which may be delayed by the addition of alkalies; and it is further probable that koumiss is retained by the stomach in preference to milk, for the following reasons: (1.) That coagulation has already taken place; (2.) That the precipitated casein, the nourishing constituent, is in a very fine, almost gelatinous, condition; (3.) That carbonic acid is present in the free state and exerts a sedative action; and (4.) That free lactic acid still further stimulates and aids digestion.

THE ACTION OF LIGHT ON WATER COLOURS.

BY DR. W. J. RUSSELL, F.R.S., AND CAPTAIN ABNEY, F.R.S.

(*Continued from page* 126.)

As work depends upon absorption, it is important to remember that when the radiation (light) is decomposed into its prismatic components, it is only those rays of the spectrum which are absorbed that can do this work. Thus, if a pigment only absorbs in the red it is only the red rays which can do work and no others, and so on.

In estimating the chemical action effected on a body by radiation there are thus two factors which have to be taken into account, viz., the intensity of the radiation acting, and the time during which it acts. To obtain the same amount of action in two cases the product of these two amounts must be the same. Thus if a certain tint be exposed to an intensity of radiation which we will call 100 and bleaches it in, say, one hour, then if a similar tint be exposed to an intensity 1, it will require 100 hours' exposure to it to effect the same bleaching. This has been fully proved by experiment. There is an idea abroad that if the light be very feeble, a bleachable colour, no matter what length of exposure be given, will not fade. This, however, is not the case. The same proportion of the total energy absorbed by the body which, with an intense radiation, effects chemical decomposition, is expended with a feeble radiation in doing the same kind of work. To appreciate this we may very briefly allude to what the deductions from scientific experiment lead us to believe to be the manner in which light acts on the molecules of which a body is composed.

In a compound body the molecules must at the very least consist of two ultimate atoms, and these oscillate to and fro from one another, each atom having its own constant time of completing an oscillation, the molecule itself oscillating in a period of its own. It need scarcely be said that the time of these oscillations is not to be measured even by millionths of a second, nor the extent of the oscillation by the millionths of an inch, but by standards very far smaller. A ray of light of any pure colour is due to a continuous series of oscillations or waves of a known and measurable length in the physicist's "ether" which we have already mentioned. If it happens that the time of oscillation of some "light" wave agrees with the time of oscillation of one of the atoms, the length of swing of the oscillation of this last is increased with each beat of the ether, till, if the number of beats of the ether be sufficiently numerous—that is, if the light be allowed to play upon the molecule long enough—the length of its swing is increased, till finally the atom will swing off from the molecule, thus changing its composition. This liberated atom may join itself to the molecule of some other matter which may be present, such as oxygen or water. The amount of increased swing the waves of light can give the atom depends on the amplitude of the waves (the amplitude in a wave in the sea is the height from trough to crest), the square of which is a measure of their energy as it is of the intensity of the light. To take a very familiar example, suppose a heavy church bell hung without any friction on its supports, and without any resistance to its motion, and that when vibrating freely, it would make a complete swing once in a second. Suppose to the end of the bell rope was attached a small horizontal plate, and that at intervals of a second 1000 grains weight of water fell from a fixed height on to the plate, the bell would gradually oscillate, and finally the oscillations would become so great that it would ring. If instead of 1000 grains falling from the same height we had 1 grain of water falling every second, it would take 1000 times longer before the bell rung, and if it was $\frac{1}{1000}$ of a grain of water that fell every second it would take 1,000,000 times as long before it rang. The work done by the dropping water may be looked upon as the work done by the amplitude of the wave, and the church bell as the atom, moving without friction and without resistance.

It will also be noticed that it is only those rays whose waves beat in unison with the oscillation of the atom which increase the swing of the atom. The wave motion is then destroyed, and that particular ray disappears, *i.e.*, is absorbed. It must be recollected that the visibility of any change effected on a body merely means the number of molecules altered. In feeble light the numbers altered in a given time are much fewer than when light is intense. A good instance of this is seen in a photographic plate, where the effect of the exposure for $\frac{1}{1000000}$ of a second to sunlight on a salt of silver is invisible to the eye, whilst a second's exposure is rendered visible. We know, however, that $\frac{1}{1000000}$ of a second's exposure to sunlight has chemically altered some minute portion of the silver salt on which it fell, as what is termed development proves it. Again, we have a further definite proof in the case of certain colours that the smallest intensity of radiation if sufficiently prolonged effects a chemical change in them. In photographic processes the chloride of

silver is only sensitive, roughly speaking, to the extreme violet of the visible spectrum. When any one of certain colours which are fugitive are applied to stain the silver chloride, and the part of the spectrum which the colour absorbs is below the violet, then after exposure in the spectrum on applying a developer, as it is called in photography, the action of the spectrum in decomposing the colour of the dye is shown by a deposit of silver taking place in that part which the colour absorbs. Thus, if carmine (cochineal) be applied to the chloride of silver, an action will be shown to take place in the green where the colour, as will be seen, absorbs. It must be remembered that without that colour no such deposit would be possible. The spectrum of sunlight will cause this phenomenon to appear in a few seconds, and the spectrum of skylight, or of candlelight, will equally cause it if the exposure is prolonged. That is to say, a feeble radiation (light), if sufficiently prolonged, will give the same effect as a radiation (light) which is several thousand times as intense. And it further demonstrates that chemical decomposition takes place in a colour long before such change is visible to the eye.

The heating effect on a body may be taken to be an increase in the amplitude in the oscillations of the molecules rather than of the atoms (though the two are closely connected), pointing to the fact that the shorter wave-lengths which have a greater rapidity of oscillation are those which would be most likely to increase the amplitude of the oscillations of the atom, and thus to produce a chemical change in the body. It will be seen further on that this is the case.

As to the light to which pigments in water-colour drawings are ordinarily exposed in a room, a few remarks must be made. There is no doubt that pictures are, as a rule, carefully protected from direct sunlight, but it is nevertheless true that the greater portion of the light they receive is reflected sunlight. On a bright day clouds reflect sunlight, and on a dull day the principal part of the diffused light is also sunlight, which is reflected according to the laws of geometrical optics from particle to particle, a certain percentage eventually reaching the earth through the clouds. There is of course also a fair proportion of the light due to the sky, and this light is bluer than reflected or diffused and weakened sunlight. In cases where the windows of a gallery are in the vertical walls and have an uninterrupted view of the horizon, the blue light reflected is comparatively small, the light near the horizon being distinctly more like sunlight than is that nearer the zenith. In galleries lighted like those at South Kensington by skylights the light to which pictures are subjected is on the whole bluer. The artificial lights to which water colours are exposed are gaslight, the arc, and incandescence electric lights, and as will be seen presently the first and last are very deficient in blue rays.

In conducting the experiments it became necessary to choose the light which would most readily adapt itself to giving a clue as to which colours were affected by exposure in a time which would be measured by months instead of by years. A careful consideration led the experimenters deliberately to avail themselves of as much sunlight as could be secured in this rather sunless climate, together with the diffused and sky light, when sunshine was absent, which would act less energetically. Writers have expressed themselves as disinclined to accept deductions as to the fading of pigments when exposed to this bright light of the sun, but they have never given any serious reasons for their disinclination. Their arguments have usually been based upon their own convictions rather than on experimental proof of any kind, or if experimental proof has been quoted from other writers, half the truth or more is most frequently and probably unwittingly concealed.

To the eye the hue of the lights mentioned above undoubtedly differ considerably, and unless the cause of the difference had been tracked out experimentally and with scientific exactness, it would have been unwise to have chosen out any one of them with which to conduct experiments, since the results obtained with it might not be applicable to any other. Happily, however, for such work, the spectroscopic analysis of light furnishes irrefutable evidence that from the results obtained from exposure to one light, correct deductions may be made as to what would happen were the exposure made to another. If, by a prism, we analyse all the different kinds of light mentioned above, we find that in the visible spectra so obtained no colour is absent,* but if we compare the intensity of the same colours in the different spectra we find that there is a variation. For example, if we compare the spectrum of sunlight at mid-days in May with gaslight, we find that there is considerably less violet, blue, green, and yellow light in the latter than in the former, and in light from a blue sky considerably less red and yellow.

The intensities of the spectrum colours of sunlight near mid-day in May are not very different from those of the electric (arc) light, whilst the intensities of the colours of the incandescence electric light when rendered normally incandescent are a very close approximation to those of gaslight. The light of the gas, and therefore of the incandescence electric lamp, is yellower than that of sunlight, and therefore of the electric (arc) light, owing to the increasing diminution of comparative intensity of the colours from red to violet, whilst the light from the sky is considerably bluer than that from the sun. It has been shown recently how by cutting off from the electric arc light (or from sunlight of known composition) the proper proportions of the different spectrum colours, the exact hue of gaslight or skylight can be produced.

The difference in hue of the light from any of the sources we have been considering is due to an excess or defect, but not to a total absence of intensity of the different parts of the spectrum. As regards the dark rays of the spectrum the same argument holds good. In light from the blue sky the proportion of dark rays is much smaller, and no very accurate measurement of their intensity has been made, but as the rays below the red do not cause chemical change in any of the pigments tried, this want of accurate knowledge is of no great moment in the present instance.

Since, then, all sources of light emit the same rays, but of different intensities, which can be measured, it follows that if we know which rays are chemically active, and the amount of work which, when of a certain intensity, they perform, we can, from the work done by the light from one source, deduce the work that would be done by another. The most perfect manner of noting the action of light would be to expose for a given time the pigments to the action of the spectrum formed by an unvarying source of light, and to measure the amount of chemical action (fading of the colour in most cases) which had taken place in every part of the spectrum. When the relative intensities of the different parts of the spectra from other sources of light compared with this standard spectrum were known, then the length of time during which it would be necessary to expose the colour to any one of them to produce that same total effect could be calculated. Unfortunately, even in full sunlight, months are often required to effect a visible chemical action on some of the pigments; it was therefore useless to take a narrow slice of light, say $\frac{1}{10}$ inch in width, and $\frac{1}{2}$ inch in height, and form a spectrum with it on a surface of coloured paper 4 inches in width and $\frac{1}{2}$

* We are not here taking into account the Fraunhofer lines, which in sun light and sky light are present. Even in these there is diminished radiation present.

inch in height, and wait to see when the bleaching took place.

To avoid this impracticable method resort was had to the use of coloured glasses to ascertain the part of the spectrum which was most active in producing the fading action. The glasses used were red, green and blue. It may be well here to say something regarding what is meant by the terms red, green, blue, etc., as applied to glasses. It is a very popular idea that light coming through coloured glass is really white light, which is in some way transmuted into red, green, blue, etc., as the case may be. There is no transmutation. The effect of colour is merely produced by the abstraction of certain rays, or of a proportion of them, from the white light by the material of which the glass itself is composed. In every case where any fading took place it was always found beneath the blue glass, very much less often and to a far less degree under the green, and only twice under the red glass, and was then barely perceptible. The blue glass also allows most of the dark rays beyond the violet to be transmitted. Experiment has shown that these rays are chemically active, but not to the same degree as those which are visibly transmitted through the blue glass. This might be expected, as their energy or capacity of doing work is far less.

Dark rays are nearly entirely transmitted through the red glass, very slightly through the blue and green glasses. Had the fading of the colours examined been due to the dark rays, it ought to have been shown beneath the red glass far more than under the green or the blue glass. This was not the case, and it may therefore be said that the blue, violet and ultra violet rays are those which are by far the most active in producing a change in the pigments experimented with.

As the intensity of the different rays of the spectrum coming from the different sources of light have been measured, it follows that the total intensity of the rays from each source of light transmitted through the blue glass can be calculated. These total intensities may be taken as a very close approximation to an inverse measure of the time to which the colours would have to be exposed to produce an equal result as regards fading.

It might very properly be objected that although it has been shown that the dark rays do not affect chemical decomposition, it has not been proved that the heating effect they have on a pigment might not aid the rapidity with which the decomposition takes place. Direct experiments were undertaken with this object in view. The backs of papers coloured with pigments which proved to be fugitive were placed in contact with a tin containing boiling water and exposed to light, together with similar papers merely resting against wood. Some few of those colours which are affected by heat without light in an atmosphere *saturated with moisture*, did fade with very slightly greater rapidity where exposed as above, but with the majority the rate of change was, if anything, slower. Further experiment has also shown that if the dark rays be cut off from sunlight by proper means the rate of fading in colours freely exposed is not diminished. In experiments with open tubes the temperature was only a very few degrees higher than the temperature of outside atmosphere, and therefore the experiment made by heating the pigmented paper by contact with a vessel at the temperature of boiling water was an extreme example of the effect of heat. A reference to the results of experiments shows that damp is often a factor in the rapidity of fading, and as heat tends to lessen the moisture present in the paper and pigment, it might be expected that in the majority of cases fading would result more slowly when the pigment was heated, whether by radiation or by heat applied as above.

That fading should principally take place in the blue rays was to be expected, from experiments that have been conducted with other objects, and is of great practical importance. It has been already stated that it is only those parts of the spectrum which are absorbed by a colour that can do work on it. Of all colours, the reds, yellows and greens absorb principally in the blue part of the spectrum, and the blues much less. Hence it might be expected that the former pigments would fade more rapidly than the latter if they are fugitive. And what is more important, it locates the action of the spectrum to the region which is least luminous, and which varies enormously in the different kinds of light to which pigments are exposed. Of the different kinds of daylight, viz., sunlight and skylight, to which water-colours are exposed, sunlight is the safest when reduced to equal intensity, since it contains a far less proportion of blue light than does skylight. The relative energies (capacities for doing work) of the light which is transmitted by blue glass in three cases are: blue skylight, 112·0: sunlight, 57·5; gaslight, 5·7, or very nearly in the proportions of 20, 10 and 1.

We may now consider the amount of exposure given to the pigments, and thence deduce, within limits, the time that would be taken to produce a similar effect in the light to which they would ordinarily be exposed. Between the middle of May to the middle of August, that is, from the time when the exposures were first made to the time when the first series of readings were made, there was registered at Kew Observatory 705 hours of bright sunshine, and at Greenwich 652. We may therefore take it that there were about 675 hours of the same bright sunshine at the place in which our colours were exposed. Not only, however, did they receive this sunshine, but also the light from the sky. The total number of hours of effective daylight which they received in the same time was about 1700 hours. We can make a very fair comparison between sunlight and skylight from the results obtained by experiment. When the sun is bright, we may take it that the sky is not overcast, but is fairly clear, and if, by photometry, we may measure the brightness of the total light from the sky and of sunlight, and of the skylight separately when illuminating a surface placed vertically and facing the direction towards which the papers were exposed, we can calculate the ratio of the brightness of sunlight and skylight. It would be manifestly of little use to take measures of the whole of the components of the light, for we have shown that if we take a unit of light of blue sky and a unit of sunlight, we have much more blue light in the former than in the latter. And, as it is the blue rays that we have shown to be effective in acting on those pigments which do fade, the photometry had to be confined to these rays alone. The average intensity of the blue rays in *direct* sunlight (*i.e.*, with the receiving surface held normally to the direction of the sun's rays), is attained very nearly at 3.30, thus in the middle of August it is about ·63 of that of the maximum. In the case of our tubes, however, the pigments were not exposed so that the surface was normal to the direction of the sun's rays; but always with the surface vertical. As they were cylindrical, it might, at first sight, have appeared to be a matter of some difficulty to say whether the photometric measurements should be made with a vertical surface facing east, south, or west. A reference to the tubes themselves, however, solved the question, as it was found that the greatest fading took place in that part of the paper which was parallel to the building against which the tubes were hung, and it was this direction in which the surface of the photometer to be illuminated was placed. The conditions of exposure required that the effect should also take into account the reflection from the glass, and this was duly attended to. As a result, it was found that though the illumination by the sun near mid-day of a vertical

surface facing 20° east of south was on an average nearly 4·5 times more intense in blue light than was the sky, yet there was a steady diminution in the ratio after about three hours on each side of when the maximum was attained; owing to the greater inclination the paper had to the solar rays and also to the increased reflection from the glass from the same cause. It may be fairly taken that the average intensity of the blue of sunlight throughout the day is close upon 2·75 that of the average light from the sky. Although the sun, soon after its rising, shone upon the pigments, yet at about 3.30 in the afternoon they were shaded from the sunlight, and this reduces the number of hours' sun which they received to about 500 hours. The above average value of sunlight to skylight was taken with a knowledge of this fact.

The reporters thus arrive at the conclusion that when the sun was shining for 500 hours, the pigments received blue light equal to 1875 hours of that of a blue sky fully illuminated when the sun shone on them. Besides this, the pigments received 200 hours of blue sky towards sunset when the colours were in the shade, which may be taken as about equal to 50 hours of average skylight illumination. The light from a sky which is cloudy has very much the same composition as sunlight itself, as has been repeatedly proved. Supposing, however, it be taken that the light was half due to blue sky and half to that of sunlight, this is equivalent to the pigments being exposed for 600 hours to light of the same composition as that of a blue light from the sky and 600 hours to light of the same average composition as sunlight. Now, for equal units of illumination skylight, as already stated, is almost exactly twice as rich in blue rays as is sunlight. Therefore, the 600 hours to which the pigments were exposed to degraded sun light were equivalent to 300 hours of light of the quality of skylight. Hence we may take it that the pigments were exposed when the sun was not shining to 900 hours of light of the same quality as that coming from the blue sky, but inferior in illumination. We have next to take some measure of what this inferiority may be. Measures taken show that the light coming from the sky at the time of year when the exposures were made varies from $\frac{3}{4}$ths to $\frac{1}{10}$th, and sometimes less in brightness of that coming from an unclouded sky, the measurements being taken at the same time of day. If we assume that the average illumination of an overcast sky is $\frac{1}{3}$ of that of a blue sky, we shall not be far wrong. Applying this factor, we find that the pigments were exposed for an equivalent of 300 hours of average bright blue sky beyond that to which they were exposed when the sun was shining. It may therefore be said that the pigments received a total illumination equivalent to 2225 hours of average blue sky, which is made up of the 1875 hours, the 50 hours, and the 300 hours. This of course is only an approximate estimate, owing to the very variable quantities dealt with, but still it will give an idea of the illumination by the blue rays which were effective in causing the fading.

We may now go a step further, and calculate approximately the amount of illumination which a picture hung in a gallery, such as those at South Kensington, would receive during the same period. No direct sunlight would be admitted, and therefore the illumination due to the direct light from the sun would be eliminated. Photometric measurements show that the blue light illuminating a picture in these galleries varies between $\frac{1}{40}$th and $\frac{1}{90}$th of that to which it (when no blinds are used for subduing the light) would be subjected if it were placed where our pigments were exposed and illuminated by the sky alone. Now when there is a blue sky the ratio is least, and we shall be safe in taking it as $\frac{1}{70}$th. For the 700 hours when the sun was shining we should therefore have an equivalent inside the gallery to about 9·3 hours of average blue sky. For the 1200 hours of light from an overcast sky we may take the factor of $\frac{1}{40}$th both for the 600 hours of light which was of the quality of light from a blue sky, and also of the light for the 600 hours which we supposed to be of the same quality as of sunlight, which, both together, we took to be equivalent to 300 hours of light from an unclouded blue sky. This would give an exposure equivalent to 7·5 hours of the average light from a blue sky, such as that to which the pigments were exposed, or in all 16·8 hours. This would make the exposure of a picture inside the gallery about $\frac{1}{130}$th of that given to the pigments during the same time. If the whole year was of the same daily average brightness as that between May 15 and August 15, the same effect would have been produced on the pigments located against the walls of one of these galleries in about 32 years. Seeing that the daily intensity and continuance of light is so enormously diminished in the autumn and winter it will not be overstating facts to say that it would have taken 100 years in the gallery in question to have arrived at the same degree of fading as to that to which the pigments had arrived by the sunlight experiments up to August, 1886.

The reporters next endeavour to make an approximate estimate of the time which would have been required had the experiments been conducted in light falling on the walls of the same gallery when lighted by gaslight or the electric glow lamps. General Festing furnished them with the measurements taken by him with the Preece photometer of the illumination of the walls of some of the galleries so lighted.

The N.E. water colour room (gas) 1·81 candles at 1 foot off.

The S.E. water colour room (gas) 2·32 candles at 1 foot off.

The Jones Bequest Gallery (electric glow lamp) 1·72 candles at 1 foot off.

Raphael Gallery electric (arc) light 2·26 candles at 1 foot off.

Sheepshanks Gallery electric (arc) light 3·12 candles at 1 foot off.

The glow lamp light and the gas light have very closely the same composition, and it may therefore be taken that the mean illumination on the walls lighted by gaslight and electric incandescence lamps is equal to two candles at one foot off. The illumination of the same galleries by daylight has been measured, and the mean light for the whole year may be taken as about six candles at one foot off. The illumination in the winter months is so small that this average may be taken. That is, the mean illumination by day is three times better than by night, but the blue rays in one unit of the illuminating value of light of gaslight are only $\frac{1}{10}$th on cloudy days to $\frac{1}{20}$th on days when the sky is clear of those contained in a unit day light. We may take $\frac{1}{15}$th as a probable proportion, and on this assumption the blue light illumination by the latter is about $\frac{1}{45}$th of that of the former. That is to say, that one hour's exposure to mean daylight is about equal to 45 hours of gaslight. It has already been estimated that to produce the fading which took place in the colours between May and August in direct sunshine at least 100 years would have been required had the exposure been made in the gallery. Allowing for the duration of darkness, it would have taken at least 2000 years continuous illumination to have produced the same result in gaslight or in the light from the electric glow lamps. With the arc electric light, giving an illumination of $2\frac{1}{2}$ candles at one foot off, it is calculated, on similar data, that the same result would have been obtained in not less than 200 years.

The final results were obtained after an exposure between May, 1886, and March, 1888, during which time there had been about 3000 hours of sunshine in all,

2100 of which it may be taken fell on the colours. Making the same estimates as before, this would be equivalent to 8800 hours of mean blue sky light. There would be left about 8000 hours of light during which no sun was shining. Taking it as before, it would be found that this was equal to 6000 hours of subdued blue sky light, and when reduced to $\frac{1}{3}$rd, would be equivalent to 2000 hours of mean bright blue sky light. This, with the sunlight, would give a total of 10,800 hours of the blue sky light to which the pigments were exposed, or about 4·8 times the amount which they received between May and August, 1866. To produce the final result therefore it would have been necessary to expose them in the gallery for at least 480 years, and to the gas light continuously for 9600 years. Had they been exposed to the whole of the light coming from the southern sky alone, shielding the colours from direct sunlight, the observations would have had to be extended for four years, and if to a northern sky probably for nearer 10 years, since the mean brightness of the latter is considerably less than the former. With these estimates before them, it is not surprising that the reporters should have preferred to use an illumination which would give results which they themselves should be able to discuss.

(*To be concluded.*)

THE AMOUNT OF WATER OF CRYSTALLIZATION IN MORPHINE.*

BY O. HESSE.

Until recently it was generally considered that morphine dried at 100° C. had the composition represented by the formula $C_{17}H_{19}NO_3 + H_2O$, notwithstanding that several years since I pointed out that at this temperature the alkaloid would lose its water of crystallization. Subsequently, however, Dott showed† that morphine is already anhydrous at 90° C. Dieterich has also recently found‡ that the above formula does not hold good for the alkaloid dried at 100° C., and is equally inapplicable to the air-dried substance, since, instead of the calculated amount of water (5·94 per cent.), 6·39 per cent. was obtained. Dieterich, however, only carried out one experiment, so that control was wanting. Meanwhile it must be remembered that Dott also found more water, and upon the basis of his experiments represented the air-dried alkaloid by the formula $8(C_{17}H_{19}NO_3) + 9H_2O$, which requires 6·62 per cent. of water, whilst the average of that found was 6·56 per cent.

Against this average value, however, some objection can be raised. In the first place it may be observed that morphine frequently encloses small quantities of the solvent from which it has been separated, and which under ordinary conditions escapes with difficulty or not at all. In order therefore to render this accident harmless in the determination of the water it is necessary to rub the crystals to a fine powder, which Dott does not appear to have done, so far as can be inferred from his communication.

The last two quantities given—6·22 and 6·35 per cent.—correspond very well with the formula hitherto accepted, but differ considerably from the quantity calculated for the more complex formula and also that found by Dieterich. As Dieterich found practically more water than Dott, it seemed to me that an occasion presented itself to me to repeat my determinations on the point. A freshly precipitated preparation, operated upon in accordance with the previously mentioned facts, gave, after forty-eight hours, water of crystallization equal to 5·99 per cent., and after a further forty-eight hours equal to 5·91 per cent. The temperature of heating reached 110° C.

The correspondence of the value found with that calculated for the value $C_{17}H_{19}NO_3 + H_2O$, is evidently such as to leave no doubt as to the correctness of that formula, and it may therefore be assumed that the excess of water which Dieterich found depended only upon accident.

* From the *Pharmaceutische Zeitung*, August 11.
† *Pharm. Journal*, [3], xviii., 701.
‡ *Pharm. Centralhalle*, 1888, p. 317.

VANILLA CULTIVATION IN MEXICO.*

The *Republican*, of St. Louis, some time ago contained the following note on vanilla cultivation in Mexico, communicated by C. B. Pedretto, of Mexico:—

"Vanilla flourishes in two places in Mexico, Papantea, in the State of Vera Cruz, and Misantia, but the first place is the most important. This town, of about 10,000 inhabitants, is in the land of the Toconaco Indians, who are as indolent and improvident as any people on earth. Vanilla is found wild in the forests around Papantea clinging to the trees and bushes for support. When the beans ripen in November or December the natives go out into the forests to gather them. All kinds are put into old sacks together and brought into Papantea to market. Here there are a number of buyers, Spaniards or Americans, and the competition reminds one of what is to be seen in a street where second-hand stores prevail. The old women are generally in the lead, half naked, and with haggard faces begrimed with dirt. Then come the children, equally pitiable in appearance, and finally the old men bring up the rear, their long, stiff hair matted and dirty, sometimes standing out twelve inches, while their beards, filthy and long, lend a finish to the picture that is most revolting. The beans are purchased by middlemen at the rate of 42*s.* or 50*s.*, per 1000, taken as they are put up by the natives. One thousand good-sized green vanilla beans will weigh 60 lbs.; the same when cured about 10 lbs. The first fine morning planks are arranged and covered with quilts on which the beans are laid after being divested of their stems. The sweating process, as it is called, then takes place, and has to be repeated seven times before all the water has evaporated. Then the beans are heated slightly and placed on shelves to dry and air. After this they are assorted in lots of fifty beans, graded according to length. In fine weather the curing process takes three weeks, but such weather rarely prevails, and the curing sometimes takes from four to five months. Last year the beans sold for 50*s.* per 100, which was about a pound, but owing to a heavy crop this year and the growing competition in the business, the best beans only bring 50*s.* a pound or 100, and the inferior from 30*s.* to 42*s.* The principal markets for vanilla beans are New York, St. Louis, and Chicago. They are bought chiefly by wholesale druggists and fine confectioners, and are becoming an important article of Mexican commerce. Last year, from the vicinity of Papantea alone, 60,000,000 beans were exported."

IMPROVEMENT IN THE MANUFACTURE OF PHOSPHORUS.*

A patent was recently granted to A. Nicolle, of Paris, for an improved process of making phosphorus. The mineral phosphate, either natural or artificial, is treated with nitric acid, and then, on the addition of potassium sulphate, the calcium is precipitated as sulphate. This is removed by filtration, and mercurous nitrate in proper quantity is introduced. The phosphate of mercury thus obtained is distilled with carbon, when first mercury and then phosphorus are distilled over. To the calcium nitrate solution more potassium sulphate is added, and the resulting potassium nitrate crystallized.

* From the *American Druggist.*

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Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE BRITISH PHARMACEUTICAL CONFERENCE.

THE pharmaceutical festival annually held under the auspices of the British Pharmaceutical Conference is now so near that it is time to place before our readers some information as to the nature of the communications that will be brought before the meeting at Bath, and through the courtesy of the Honorary Secretaries we are enabled this week to publish a preliminary list of the papers which have already been received by them. It is to be expected that this list will still receive additions to be made known before the time of the meeting, but in any case, we may anticipate that besides the attractions of the more formal portions of the business of the Conference the popularity of the President of this year will have a powerful influence in securing a good attendance of members. Without any disparagement of previous Presidents we may refer to Mr. BENGER as combining in himself so happy a representation of the two leading ideas of scientific work and good fellowship, which it has been the object of the Conference to foster and develop, that we may safely venture on the prediction that he will ably and worthily fill the position that has been so well maintained by his predecessors in the Presidential chair. For that reason we look forward to the Bath Meeting as likely to be an eminently successful one in every respect. The attractions of the city itself and of the country around it may also influence many to decide upon making their attendance at the Conference meeting the opportunity for a brief holiday excursion either before or after it takes place. The programme of the proceedings, to which we have already called attention, comprises all the usual attractions of these meetings, and the remarkable thermal springs of Bath, as well as the historic interest attaching to the city as a health resort and bathing place for some hundreds of years past, ought alone to be inducements to take advantage of the opportunity of visiting Bath under such favourable conditions as will be offered on this occasion.

The excursion which is arranged to take place on the Thursday after the business of the Conference has been concluded is one that will equal in variety of interest any of those which have hitherto afforded so much pleasure to attendants at the Conference meetings. The Severn Tunnel, the old town and castle of Chepstow, Tintern Abbey, and the beautiful valley of the Wye, are the objects of interest which it will comprise. With this bare enumeration of the features of interest connected with the forthcoming meeting of the British Pharmaceutical Conference at Bath, we may confidently leave the question of being there as one that will be very generally decided in the affirmative.

The following is a list of papers received:—

1. Proximate Analysis of the Seeds of Cassia Tora. By W. ELBORNE, F.L.S.
2. Lard: Its Adulteration with Cotton Seed Oil and Detection thereof. By M. CONROY, F.C.S.
3. On the Antiseptic Properties of some of the Fluorine Compounds, and on the Sodium Silico-Fluoride as an Antiseptic for Surgical and General Purposes. By W. THOMSON, F.R.S.E., F.I.C.
4. A Few Laboratory Notes. By R. WRIGHT.
5. On the Chemistry and Pharmacology of some of the Morphine Derivatives. By D. B. DOTT, F.R.S.E., and RALPH STOCKMAN, M.D.
6. Oil of Cajuput. By W. WEST, F.L.S.
7. Vinum Ipecacuanhæ. By G. A. GRIERSON.
8. Carthagena Bark. By D. HOOPER, F.C.S., F.I.C.
9. Hybridisation of Cinchonas. By D. HOOPER, F.C.S.
10. Note on Cephaëlis Tomentosa. By F. RANSOM.
11. A communication has also been promised by Mr. E. M. HOLMES, F.L.S.

MEETING OF THE GERMAN SCIENTIFIC ASSOCIATION.

THE sixty-first meeting of German scientific investigators and physicians will take place this year at Cologne. The meeting will open on Monday, the 17th September, with a social gathering for the reception of the visitors in the Casino on the Augustinerplatze. On Tuesday there will be a general meeting of the members in the Gürzenich Saloon, from 9 a.m. to midday; at half-past twelve the sections will be formed, and at three in the afternoon the first sittings will take place. At five o'clock a visit will be made to the Flora gardens, and the evening will be spent there. On Wednesday morning the various sections will sit from eight o'clock until one. In the afternoon visits will be made to the hospital, the Hohenstaufen bathing establishment, the water-works, the sewerage works, and the cathedral. In the evening there will be a banquet in the Gürzenich Saloon. Thursday, Friday, and Saturday will be similarly occupied with sittings of the sections, visits to the Zoological Gardens and the theatre, a *fête* at Marienburg, and a convivial meeting in the Gürzenich Saloon. On Sunday an excursion will be made to the Seven Mountains on the Rhine.

The office for obtaining information and tickets of membership is at No. 6, Bahnhofstrasse, Cologne, and it will be open from the first to the twelfth of September. Lodging accommodation can be secured by application to this office. In connection with

the meeting there is to be an exhibition. So far as the arrangements for the delivery of addresses have been completed at present it is stated that Dr. WALDEYER, of Berlin, will deliver an address on the study of medicine and female students, Dr. EXNER, of Vienna, will lecture on general errors of thought, and Dr. von den STEYNEN, of Dusseldorf, on the civilization of the modern stone-age inhabitants of Central Brazil.

In the section of Pharmacy Dr. KLEIN, of Darmstadt, will deliver a lecture on the connection between chemical characters and therapeutic action; Dr. VULPIUS, of Heidelberg, will lecture on the Pharmacopœa; Dr. OSTERMEYER, of Erfurt, will lecture on some new antiseptic compounds of iodine; Herr RULBMANN, of Fulda, on the results of milk fat determination by means of the Soxhlet apparatus, and Dr. H. UNGER, of Würzburg, will lecture on sulphuric acid. In the section of Chemistry no arrangements have yet been decided upon for the delivery of lectures. In the Botanical section Herr MAX KOLB will lecture on Alpine plants occurring in plains.

Two more fatal cases of poisoning by carbolic acid are reported as having occurred in Liverpool. The victims were both women of intemperate habits, who had apparently swallowed the poison whilst under alcoholic influence, and at the inquest, in each case a verdict was returned of suicide during temporary insanity. One of the medical witnesses expressed the opinion that the sale of carbolic acid should be restricted.

* * *

The death of several horses and other animals in Bedfordshire has, after inquiry, been attributed to their having eaten of the lesser spearwort (*Ranunculus Flammula*), the growth of which in boggy parts of meadows is said to have been favoured this year by the wet weather. It is stated that the coating of the stomachs of the deceased animals was covered with blisters produced by the irritant principles of the plant.

* * *

The *Medical Press* is evidently in favour of a more extended knowledge of materia medica being required of medical students. It remarks that, as matters at present stand, a student may with impunity confess himself unable to recognize such substances as nitrate of silver arsenic, sweet spirits of nitre, quassia, nux vomica, calabar bean, camphor, etc., and goes on to state that there is no valid reason why he should not be required to afford evidence of having familiarized himself with the physical characters of every drug which admits of being distinguished offhand. As it is, a man may pass the examination though utterly unable to say which bottle contains cod liver oil and which treacle. Materia medica, or what is known on the continent as pharmacognosy, will, it is believed, receive more prominence than has lately been given to it in medical schools, and pharmacists who have made themselves thorough masters of the subject may possibly find themselves called on to teach this subject, as not a few have already been.

Linnean Society of New South Wales.

SOME REPUTED MEDICINAL PLANTS OF NEW SOUTH WALES (INDIGENOUS SPECIES ONLY).*

BY J. H. MAIDEN, F.L.S., ETC.

(*Continued from page* 136.)

29. EUPHORBIA spp.

It is stated that the natives of the Northern Territory use the juice of a species of *Euphorbia* as a specific in small-pox.

Another species affords a juice said to be a remedy in cancer. Without committing oneself to an expression of opinion as to the utility of the Euphorbias alluded to, it can be safely asserted that our native Euphorbias will doubtless well repay a thorough examination of their medical properties.

30. EUPHORBIA DRUMMONDII, Boiss., N. O. Euphorbiaceæ, 'B. Fl.,' vi., 49.

Called "Caustic Creeper" in Queensland, and "Milk Plant" and "Pox Plant" about Bourke, New South Wales.

An alkaloid called "Drumine" has been extracted in Australia from this plant. It is said to have the same local action as cocaine, but more extended experience will be necessary before its true value can be assigned.

Since the above was written the so-called alkaloid has been examined in England and found to consist mainly of calcium oxalate (*Pharm. Journ.*, Jan 7, 1888).

No explanation has up to the present been vouchsafed in explanation of what is either crass ignorance or trifling.

Some people contend that this plant contains no poisonous principle, yet cases of poisoning (chiefly of animals) seem without any doubt to have been traced to this particular plant. But perhaps its virulence only exists at a certain stage of its growth.

In western New South Wales the aboriginals use an infusion or decoction of the plant in genital diseases, and use rather strong doses, but it is said that an overdose simply causes headache.

The late Mr. P. A. O'Shanesy observes ('Proc. Linn. Soc. N. S. W.' VI.) that this plant is said to be an infallible remedy in dysentery and low fever.

This plant is found in all the colonies.

[I am tempted to submit the information I have collected in regard to *E. pilulifera*, but in New South Wales localities it is probably introduced.]

31. EVOLVULUS ALSINOIDES, Linn. (*E. linifolius*, Linn., in Muell. 'Cens.,' p. 95) N. O. Convolvulaceæ, 'B. Fl.,' iv., 437.

The stalk, leaves and roots are a reputed remedy in dysentery and fever (Ainslie).

This plant is found in all the colonies except Victoria and Tasmania.

32. EXÆCARIA AGALLOCHA, Linn., N. O. Euphorbiaceæ, 'B. Fl.,' vi., 152.

"River Poisonous-tree," "Milky Mangrove," "Blind-your-eyes."

This tree produces by incision in the bark an acrid, milky juice, which is so volatile, that no one, however careful, can gather a quarter of a pint without being affected by it. The symptoms are an acrid burning sensation in the throat, sore eyes and headache; a single drop falling into the eyes will, it is believed, produce loss of sight. The natives of Eastern Australia, as well as those of New Guinea, etc., use this poisonous juice to cure certain ulcerous chronic diseases, *e.g.*, leprosy; but in Fiji the patient is fumigated with the smoke of the burning wood (*vide* Seemann, 'Flora Vitiensis').

In India the sap of the tree is called "Tiger's Milk,"

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* From vol. iii. (Series 2nd) of the 'Proceedings of the Linnean Society of New South Wales,' March 28, 1888.

and is said to be applied with good effect to inveterate ulcers. The leaves also are used in decoction for this purpose. A good caoutchouc may be prepared from the milk.

This tree extends to Northern Australia.

33. FLAGELLARIA INDICA, Linn., N. O. Liliaceæ, 'B. Fl.,' vii., 10.

"Lawyer Vine."

The leaves are said to be astringent and vulnerary. This plant extends to Northern Australia, but is not endemic in Australia.

34. FLINDERSIA MACULOSA, F. v. M. (*F. Strzeleckiana*, F. v. M., in Muell. 'Cens.,' p. 9), N. O. Meliaceæ, 'B. Fl.,' i., 388.

"Spotted or Leopard Tree."

The clear gum of this tree is used by bushmen in the Western Districts as a remedy for diarrhœa. It is a gum of the Arabic class, and apparently nothing but its local abundance causes it to be singled out for this special use. Wattle gum is occasionally used for this purpose, and is more efficacious when slightly astringent by reason of included fragments of bark.

The tree is also found in Queensland.

35. FRENELA ENDLICHERI, Parlat. (*Callitris calcarata*, R. Br. in Muell. 'Cens.,' p. 109), N. O. Coniferæ, 'B. Fl.,' vi., 238.

"Cypress Pine," "Black Pine," "Red Pine," "Scrub Pine."

"Murray Pine."

Mr. Bäuerlen informs me that the twigs of this tree are used in Northern Victoria and Southern New South Wales for mixing with fodder to expel worms in horses. See also *Boronia rhomboidea*.

This plant extends from Northern Victoria to Central Queensland.

36. GEIJERAA SLICIFOLIA, Schott, N. O. Rutaceæ, 'B. Fl.,' i., 364.

"Balsam of Copaiba Tree," "Wilga."

The bark of this tree contains a powerful bitter, and has the odour of the drug from which it obtains one of its vernacular names.

It is also found in Queensland.

37. GOODENIA spp., N. O. Goodeniaceæ.

A species of *Goodenia* is supposed to be used by the native gins to cause their young children to sleep while on long journeys, but it is not clear which is used or how it is adminstered (Bailey).

Many plants of this Natural Order contain a tonic bitter which does not seem to have been critically examined.

38. GRATIOLA PEDUNCULATA, R. Br., and GRATIOLA PERUVIANA, Linn., N. O. Scrophularineæ, 'B. Fl.,' iv., 492–3.

The latter plant is called "Brooklime" or "Heartsease."

A decotion of these plants is used by people in the Braidwood district for liver complaints, with (many say) good results. They enter into domestic medicine for some complaint or other in various parts of the colonies.

The latter plant is not endemic in Australia.

39. GUILANDINA BONDUCELLA, Linn. (*Cæsalpinia Bonducella*, Fleming, in Muell. 'Cens.,' p. 42), N. O. Leguminosæ, 'B. Fl.,' ii., 276.

I have never heard of any portion of this plant entering into Australian medicine, but as it is largely used in different parts of Asia, some reference to it may be convenient.

The seeds are called "Molucca beans," and "Nicker or Bonduc-nuts."

The kernels of the nuts are very bitter, and are said by the native doctors of India to be powerfully tonic. They are given in cases of intermittent fevers, mixed with spices in the form of powder. Pounded and mixed with castor-oil they are applied externally in hydrocele. At Amboyna the seeds are considered anthelmintic, and the root tonic in dyspepsia. In Cochin-China the leaves are reckoned deobstruent and emmenagogue, and the root astringent. The oil from the former is used in convulsions, palsy, and similar complaints (Drury).

They are frequently thrown up by the Gulf Stream on the shores of Scotland.

40. HARDENBERGIA MONOPHYLLA, Benth. (*Kennedya monophylla*, Vent. in Muell. 'Cens.,' p. 41), N. O. Leguminosæ, 'B. Fl.,' ii., 246.

Commonly, but wrongly, called "Native Sarsaparilla."

The roots of this plant are sometimes used by bushmen and others as a substitute for the true Sarsaparilla (*Smilax*), but its virtues are purely imaginary. It is also a common thing in the spring in the streets of Sydney to see persons with large bundles of leaves on their shoulders, doubtless under the impression that they have the leaves of *Smilax glycyphylla*.

This plant is found in all the colonies except Western Australia.

41. HERPESTIS MONNIERIA, H. B. et K. (*Bramia indica*, Lam. in Muell. 'Cens.,' p. 97), N. O. Scrophularineæ, 'B. Fl.,' iv., 491.

This small creeping plant is common to the tropical portions of both hemispheres. It is regarded by the Hindoos as a powerful diuretic and aperient, and the juice of the leaves, conjoined with petroleum, is used in India as a local application in rheumatism. "Whatever benefit is obtained from this formula is doubtless due to the petroleum" ('Pharm of India').

42. HYDROCOTYLE ASIATICA, Linn., N. O. Umbelliferæ, 'B. Fl.,' iii., 346.

In anæsthetic leprosy good results have followed the use of this herb, but it possesses no claim to the character of a specific attributed to it by some. It has been found more useful in secondary or constitutional syphilis, especially in those cases where the skin and subjacent cellular tissue are principally affected. In non-specific ulcerations, and in skin-diseases it is of value both as an internal and local remedy ('Pharm of India').

43. INDIGOFERA ENNEAPHYLLA, Linn., N. O. Leguminosæ, 'B. Fl.,' ii., 196.

An infusion of the whole plant is diuretic, and as such is given in fevers and coughs in India (Ainslie).

It is also found in South Australia, and from New South Wales to Northern Australia.

44. IONIDIUM SUFFRUTICOSUM, Ging. (*Hybanthus enneaspermus*, F. v. M. in Muell. 'Cens.,' p. 6), 'B. Fl.,' i., 101. See also Muell. 'Fragm.,' x., 81, where no less than eighteen synonyms of this widely distributed species are given.

The leaves and tender stalks are demulcent; they are also employed when mixed with oil, as a cooling liniment for the head. The roots of this species are also used in India in diseases of the urinary organs (Ainslie). Other species are used medicinally in various parts of the world, and there is no doubt that the Australian species possess medicinal properties.

The present species is found in North and South Australia, and Queensland, in addition to this colony.

45. IPOMÆA PES-CAPRÆ, Roth., N. O. Convolvulaceæ, 'B. Fl.,' iv., 419.

The boiled leaves are used externally as an anodyne in cases of colic, and in decoction in rheumatism; the juice is given as a diuretic in dropsy, and at the same time the bruised leaves are applied to the dropsical part (Dymock, 'Materia Medica of Western India').

This plant is found in Western Australia, and from New South Wales to Northern Australia.

46. JUSTICIA PROCUMBENS, Linn., N. O. Acanthaceæ, 'B. Fl.,' iv., 549.

In South India the juice of the leaves squeezed into the eyes is a remedy in ophthalmia (Drury).

This plant is found in all the colonies except Tasmania and Victoria.

47. LAPORTEA GIGAS, Wedd., N. O. Urticeæ, 'B. Fl.,' vi., 191.

"Giant Nettle." "Irtaie" of the aboriginals of the Richmond and Clarence. "Goo-mao-mah" is another aboriginal name.

The poisonous fluid secreted from the foliage is very powerful, particularly in the younger leaves, and their sting is exceedingly virulent, producing great suffering. Cattle become furious when they come into contact with the leaves.

It is stated that the pain caused by the sting of this plant will be instantly relieved by the milky juice of the lower part of the stem of *Colocasia macrorrhiza* being rubbed on the affected part ('Proc. R. S. Queensland,' 1885).

This tree is also found in Queensland.

48. MALLOTUS PHILIPPINENSIS, Muell. Arg., N. O. Euphorbiaceæ, 'B. Fl.,' vi., 141.

The reddish powder from the capsules of this plant, called "Kamala" by the Hindoos, is a useful vermifuge, especially adapted for the expulsion of tænia.

This tree extends to Queensland.

49. MELALEUCA UNCINATA, R. Br., N. O. Myrtaceæ, 'B. Fl.,' iii., 150.

One of the common "Tea-trees." (Called "Broom" in South Australia, according to Mr. Tepper.) It was formerly called "Yaang-arra" by the aboriginals of Illawarra.

According to Mr. J. G. O. Tepper ('Proc. R. S. S. A.,' iii., 174), the leaves of this plant, if chewed, are very useful in alleviating and curing ordinary catarrh. This observation is well worth repeating, especially as this particular species is widely distributed, and as there is no reason to suppose that this property is confined to this single member of a very large genus.

Found also in Western and South Australia, Victoria and Queensland.

50. MELIA COMPOSITA, Willd., N. O. Meliaceæ, 'B. Fl.,' i., 380.

"Dygal" of the aboriginals of northern New South Wales. "White cedar" and "Cape lilac" of the colonists. Called "Persian lilac" and other names in India.

The Hindoos use the flowers, fruit, leaves and bark for many medical purposes. The root-bark is on the secondary list of the United States Pharmacopœia as an anthelmintic. In large doses it is said to produce narcotic effects, though these, if produced, pass off without injury to the system.

This tree extends from New South Wales to northern Australia.

(*To be concluded.*)

New York State Pharmaceutical Association.

FLOWERS AND THEIR WINGED FRIENDS.*

BY R. G. ECCLES, M.D.

(*Concluded from page* 139.)

The stigmas ripen first, and therefore, on being released, the flies are just in a condition to fertilize any other plant of the same kind they may enter. Learning nothing from past experience, the chances are that they will make directly for the first arum they see. The stiff hairs allow ingress, but no egress, until the anthers ripen and cover them once again with pollen. Then the hairs die and allow the fly to escape, when it repeats over and over again the same actions. Bees seem to be the most intelligent of all honey or pollen gatherers, and flowers adapted to them surpass all others in variety and brilliancy of colour. Professor Darwin, in his work on 'Cross and Self-Fertilization in the Vegetable Kingdom,' has given a most interesting chapter devoted mainly to their habits in dealing with flowers. He points out the fact that when seeking honey they keep to the same species of flowers as long as the yield continues. Other insects do the same. It is at once apparent that this is just what they should do to be of service to the plants, for the carrying of pollen promiscuously from and to all sorts at the same time would be a very useless piece of work. Professor Darwin explains this habit by showing that more honey can be gathered in a given time by their learning how to stand and work best on those of a shape they have become accustomed to. It gives them less trouble than if they changed from species to species without order. It is also apparent that they can distinguish between varieties of the same species better than many human beings. They will not pass by a flower of a different variety, even when the colour is markedly different. If they are captured on the wing and examined with a magnifying glass, only the pollen of the species they are working is likely to be found upon them. They have often been seen going toward a different species that closely resembles the one they were working, but on getting near enough to discover their mistake, they would turn away without trying to alight. When all the flowers of a given species have been visited they then begin upon another with which they remain as before, until finished. Their search for honey is generally begun at the lowest blossom of a stock and finished at the top. As a very large number of flowers avoid self-fertilization by developing their anthers and shedding their pollen before the stigmas are ready to receive it, this habit of theirs is highly favourable. The lowest flowers receive on the ripened stigma the pollen carried from the last flowers. The upper ones receive no pollen, as it is all rubbed off before reaching them, and it would be lost if they did, for they are not ready for it. But as their anthers are ripe they can cover the bee with a fresh supply to carry to the next plant, whose lower flowers have waiting ripened stigmas ready to receive it. In lavender flowers (*Lavendula vera*), the stamens are higher than the stigmas, and would readily self-fertilize, but for the fact that the former ripen before the latter, and allow visiting bees to act in the manner here described. In fox-glove (*Digitalis purpurea*, L.) the anthers are all shed before the stigmas can receive any pollen, so that visiting bees have everything prepared for their visit to be the most beneficial possible. Here the stigma is double, and before ripening its faces are flat against each other, but when ripe they open up like a letter V. As bees enter the flowers having open stigmas, they deposit pollen thereon. When visiting those that are shedding pollen they get their supply. In monkshood (*Aconitum Napellus*, L.) we have a somewhat more complex arrangement. The stamens crowd themselves forward into the bee's way a few at a time. As soon as their pollen is shed they double back out of the way, as if conscious of being no longer wanted. When the last of them has finished and doubled back deep into the flower, the two pistils which had hitherto been out of sight, and pressing face to face against each other, now crowd forward into sight and separate, leaving the stigmas bare for the reception of pollen from the first visitor.

Only humble bees are able to get down into the deep nectaries where the honey is confined, and it is

* A paper read at the New York State Pharmaceutical Association. From the 'Proceedings,' 1888.

impossible for them to legitimately obtain this honey without repaying the plant by cross-fertilizing it. The shape of the flower is a marvel of adaptability for the work it performs. The blue hood protects the anthers and nectaries from harm by rain or pilfering insects. The two lateral sepals make an excellent standing place for the middle and hind legs of the bee when obtaining the honey. In the Alps, two varieties of aconite grow. One has a white blossom, the other a blue. The bees of that region have acquired a vicious habit of piercing a hole into the base of the flower where the honey is lodged, and thus robbing it without giving anything in return. The blue flowers are charged with so much aconitine they are distasteful, and, therefore, are rarely pilfered thus. The white, however, are so ravaged, and as a result they are badly fertilized and consequently dying out. Of 200 stems gathered by Dr. W. Ogle, in Switzerland, one hundred white ones were found all pierced, while the other hundred blue ones were unperforated. Professor Darwin wonders how the bees succeed in discovering from the outside of the flower where to bore. They go through invariably in the right place at a single trial. Have they at some time made many trials, and upon at last finding the right spot remembered it as they visited other flowers, or do they calculate where the proper spot should be from their experience in reaching it from the inside? Red clover (*Trifolium pratense*, L.), like aconite, is fertilized by humble bees, and it is probably with it that they acquired the bad habit of piercing. Whole fields have been found in which every corolla was perforated. Hive bees and wasps are not known to adopt this trick, but they profit from it when done by sucking therefrom, while other insects do not seem to know enough to do even this. Clover heads growing away from fields, and other flowers not crowded together pretty closely, are seldom if ever pierced. It is when compact masses grow together it occurs. Crowds of humble bees will go to work in a field of clover or garden of honey-bearing flowers, where there are many of the common species. On going over each other's track they find many blossoms sucked dry. As there is apparently much rivalry among them as to which shall get most, such blossoms cause delay that they do not seem to like. To save time they resort to the short, but vicious expedient of robbing the plant in the way described. Here, as elsewhere, they soon discover that the way of the transgressor is hard, for as the plant fails to be fertilized, there is little or no seed for the coming year. A serious reduction in the number of plants is the necessary consequence, and the poor bees during successive years are reduced in numbers from lack of food. Robbery and laziness bring hunger and death. Sometimes lack of fertilization is brought about by other and remoter causes. Some years ago in one region in England, the report of the failure of the clover crop caused an investigation that brought out the remarkable connections that sometimes subsist between things apparently unrelated. It was found that a diminution in the number of cats allowed the field mice to multiply. On the advent of the mouse plague, the humble bees nests were robbed and young bees killed by these pests. A scarcity of bees checked the fertilization of the clover, and consequently clover seed was not produced. Whether or not the destruction of the cats was due to the marrying off of old maids history does not say.

In dealing with a subject of this kind it scarcely seems complete without referring to those marvels of beauty, the orchids, but to take time to write up all that is known of them in this direction is impossible at present. Nor can more be done with our numberless garden and greenhouse plants than to merely state that they all have some sort of curious contrivance to encourage insects to come around and aid them, Many having been removed from their native habitats where some special insect carried their pollen, never produce seed with us because of the absence of such insects. Where the gardener understands the matter, some of them can be artificially fertilized by his using a small wire or thin piece of wood to transfer the pollen to their stigmas. Such flowers often go on imitating their early habits of closing and opening at certain times of the day, to keep out pilferers and allow the entrance of friends. When insects that favour them have been in the habit of coming around, then is their opening hour. When insects that would rob them of honey or pollen are abroad, they manage to be "asleep," as we popularly call it. The morning glory (*Ipomœa purpurea*, L.) gets its name from its habit of being awake in the morning, when tropical American insects that favoured it were abroad. Four o'clock (*Mirabilis Jalapa*, L.) is from the same part of the world, and gained the habit which gives it its popular name from opening late in the afternoon for a similar reason. The tuberose (*Polianthes tuberosa*, L.) is in all its glory of immaculate whiteness and rich fragrance just as day departs, because then its friends, the night moths, are around. It is a strange fact that far more white flowers, in proportion to their full number, are highly fragrant than of any other colour. This is evidently due to the fact that they are nearly all indebted to moths and night-flying insects for their fertilization. The white colour can be seen longer when the shades of night are falling, and the rich odour is a guide even after darkness has set in. The conspicuousness of white and other light colours is made use of by all closed flowers, as pointers or guides to show insects the way they should go to find the honey. Examine any verbena (*Verbena chamædrifolia*, L.), phlox (*Phlox Drummondii*, L.), violet (*Viola tricolour*, L.), or other dark-coloured closed flower, and the opening into the honey is always light-coloured, and if there is a deep corolla, long stripes of light here lead directly to where it is found. All these strange adaptations tell one tale. They are impressions left to our own day that speak of battle and victory. Each one is a choice change made by Nature, which she saw fit not to strike out. While alterations went on in every possible direction, these were the paths of protoplasmic movement that suited her purpose or harmonized with the trend of her totality. The conscious life of the planet kept picking out features pleasing to consciousness, and thus beauty, loveliness, and points of desirability grew more and more intense. As ages roll on our earth approximates nearer to the ideal dream of poets and the ecstatic visions of the early prophets. To every true heart flowers are sacred.

We choose them to typify our profoundest feelings of pleasure and express our fondest endearments. Are they not in form and colour the very embodiment of beauty? What can transcend in reverential pathos the Easter decked altar, surrounded by true, honest worshippers? Where can be found devotion more fervid or solemn than that which mingles tears and prayers with lovely flowers at the last resting place of a departed friend? Nature has lavishly strewn them over the green carpets of meadow and prairie, to break the monotony of a single hue. She has added them as a finishing touch to the stern majesty of the towering mountain precipice, and woven them in rich festoons that enmargin brooks and rivulets. No scene is so grand, and no landscape so complete, that their presence does not add a greater charm, and their colour give a richer lustre to the whole. As precious gems have an enhancement of splendour from a setting of finely chased, embossed gold, so lovely woman, bedecked with flowers, assumes such charms as transmute the highest earthly beauty into a form bespeaking Paradise itself.

British Medical Association.

THE GASEOUS CONSTITUENTS OF THE BLOOD IN RELATION TO RESPIRATION.*

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Mr. President and Gentlemen,—The subject I have chosen is a consideration of the gaseous constituents of the blood in relation to some of the problems of respiration. This has been selected both because it deals with a province of physiology in which there are many profound problems connected with the molecular phenomena of life, and also because it gives me the opportunity of illustrating some of the methods of physiological research. I purpose to treat the subject chiefly from the physical standpoint, and to demonstrate some of the phenomena as I would endeavour to do to a class of students, believing that this will be of more interest to many of my audience than if I placed before you anything like an encyclopædic account of recent researches. I cannot help adding that as I speak in the class-room of one of the most distinguished physicists of the day, I feel the genius of the place is hovering over me, and I shall be impelled to guide you to the borderland of physics and of physiology. It is in this territory that we meet with the most profound questions regarding the nature of vital activity, and it is here that the physiologist and the physicist must join hands in working out their solution.

Respiration may be shortly defined as the function or group of functions by which an interchange occurs between the gases formed in the tissues of a living being and the gases of the medium in which it lives. It is interesting to take a brief survey of the investigations which laid the foundations of our knowledge of this subject, as it illustrates to us the facts taught by the history of all sciences that those truths which we now regard as elementary were at one time unknown, and that they have been gained by laborious inquiry.

The oldest writers do not appear to have had any clear notions even as to the necessity for respiration. Hippocrates dimly recognised that during breathing a *spiritus* was communicated to the body. Many of the older anatomists, following Galen, thought that the "very substance of the air got in by the vessels of the lungs to the left ventricle of the heart, not only to temperate heat, but to provide for the generation of spirits." This notion of cooling the blood was held by Descartes (1596–1650) and his followers, and seemed to them to be the chief, if not the sole, use of respiration. In addition, they supposed it aided in the production and modulation of the voice, in coughing, and in the introduction of odours. The celebrated Van Helmont (1577–1664) strongly expresses these views, and attaches particular importance to the necessity for cooling the blood, which otherwise would become too hot for the body.

About the middle of the seventeenth century clearer notions began to prevail. These rested partly on an anatomical and partly on a physical discovery. Malpighi (1621–1694) discovered that the minute bronchial tubes end in air-vesicles, or membraneous cavities, as he termed them, on the walls of which, in the frog, he saw with his simple microscope the blood flowing through capillaries. This pulmonary plexus was for many years termed the "rete mirabile Malpighii." The physical observations were made by the celebrated Robert Boyle (1627–1691), who describes in his treatise entitled 'New Experiments, Physico-Mechanical, touching the Spring of the Air,' published in 1662, numerous experiments as to the behaviour of animals in the exhausted receiver of the air-pump. He showed that the death of the animals "proceeded rather from the want of air than that the air was over-clogged by the steam of their bodies." He also showed that fishes also enjoyed the benefits of the air, for, said he, "there is wont to lurk in water many little parcels of interspersed air, whereof it seems not impossible that fishes may make some use, either by separating it when they strain the matter thorow their gills, or by some other way."

His conclusion is "that the inspired and expired air may be sometimes very useful by condensing and cooling the blood;" but "I hold that the depuration of the blood in that passage is not only one of the ordinary but one of the principal uses of respiration." Thus, by the use of the air-pump, invented by Otto von Guericke about 1650, Boyle was able to make a contribution of fundamental importance to physiological science.

He also first clearly pointed out the real cause of the influx of air into the lungs. The older anatomists, from Galen downwards, held that the lungs dilated actively, and thus sucked in the air; and there was much controversy as to whether the chest, with the contained lungs, resembled a pair of bellows, which was filled because it was dilated, or whether the lungs resembled a bladder, which is dilated because it is filled. Boyle shows clearly that the cavity of the chest is actively dilated, and that the lungs are distended because the "spring" of the air is then less on their outer than on their inner surface. This simple explanation was not generally accepted, because the minds of Boyle's contemporaries were under the influence of an ancient idea that air existed in the cavity of the chest external to the lungs. This prevented them from seeing the simplicity and accuracy of Boyle's explanation, and to be constantly on the outlook for some mechanism by which the lungs could actively dilate. Such notions were held by Willis, Malpighi, and Erasmus Darwin. The opinion of Darwin is shown by the following passages in the *Zoönomia*:—

"By the stimulus of the blood in the right chamber of the heart, the lungs are induced to expand themselves, and by the pectoral and intercostal muscles and the diaphragm act at the same time by their associations with them." And, again, "to those increased actions of the air-cells are superadded those of the intercostal muscles and diaphragm, by irritative association."

Boyle's observations were published in 1660, and in 1685 we find Borelli (1608–1679), in the second portion of his great work, 'De Motu Animalium,' giving expression to very clear notions regarding respiration. Thus in the eighty-second proposition he shows that the lungs are not the effective causes of respiration, but are passively concerned in the movements; and in the eighty-third proposition he states that the efficient cause of inspiration is the muscular force, by which the cavity of the chest is increased and permits the lungs to be filled by the elastic force of the air. Borelli was also the first, as shown in the eighty-first proposition of his work, to make an estimate of the quantity of air received by a single expiration. At the same time he attributed calm expiration to the elastic resiliency of the ribs, and he pointed out that the deepest expiration could not entirely empty the lungs of air (Propositions 92, 93, and 94). Whilst Borelli thus recognized the air as necessary to animal life, he naturally failed in explaining why this was so, being unacquainted with the composition of the air and of the so-called "fuligineous vapours" (carbonic acid, aqueous vapour, etc.) which were supposed to exist in expired air.

I find, in a work by Swammerdam (1637–1680) dated 1667, and entitled 'Tractatus Physico-Anatomico-Medi-

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cus de Respiratione usuque Pulmonum,' at pp. 20, 21, a description of an experiment in which he immersed in a vessel of water a dog having a long tube inserted in the trachea, and he observed the rise and fall of the level of the water during respiration. This was practically the method followed by Borelli, but I am unable to say which experiment was first performed.

Here I may also refer to the curious experiments of Sanctorius, Professor of Medicine in Padua, who flourished from 1561 to 1636, as being probably the first quantitative estimate of substances escaping from the body. Sanctorius constructed a balance by which he weighed himself repeatedly, and observed what he gained by food and what he lost by excretion. The results appeared in his work 'Ars de Staticâ Medicinâ,' published in 1614, and he states the amount of matter separated by pulmonary exhalation at about half a pound in twenty-four hours. It is not easy to say precisely what these figures represent, and therefore we find the amount, on the authority of Sanctorius, differently stated by writers during the next century. His observations are of interest, however, as being a distinct step in physiological investigation.

Among the contemporaries of Boyle, Pascal, Spinoza, Barrow, Newton, and Leibnitz—all men of the first intellectual rank—was Dr. Robert Hooke, one of the most versatile and able of scientific thinkers. Hooke was born in 1637, and died in 1703. One of the founders of the Royal Society, its early proceedings show that there was scarcely any department of science at the time to which he did not make important contributions. In particular, he showed a remarkable experiment in October, 1667, to the Royal Society. This experiment, as detailed in Lowthorp's 'Abstract of the Philosophical Transactions,' vol. iii., p. 67, is so important as to require quotation.

"V. I formerly tried an experiment of keeping a dog alive after his thorax was all displayed by the cutting away of the ribs and diaphragme, and after the pericardium of the heart also was taken off. But divers persons seeming to doubt of the certainty of the experiment, I caused it to be repeated at a meeting of the Royal Society with the same success, the dog being kept alive by the reciprocal blowing up of his lungs with bellows, and then suffered to subside for the space of an hour or more after his thorax had been so displayed, and his aspera arteria cut off just below the epiglottis, and bound on upon the nose of the bellows.

"The dog having been thus kept alive above an hour (in which time the trial was often repeated, in suffering the dog to fall into convulsive motions, by ceasing to blow the bellows and permitting the lungs to subside and lie still, and of a sudden reviving him again by renewing the blast, and consequently the motion of the lungs), I caused another pair of bellows to be immediately joined to the first by a contrivance I had prepared, and pricking all the outer coat of the lungs with the slender point of a very sharp penknife; this second pair of bellows was moved very quick, whereby the first pair was always kept full, and always blowing into the lungs; by which means the lungs also were kept very full and without any motion, there being a continual blast of air forced into the lungs by the first pair of bellows, supplying it as fast as it could find its way quite through the coat of the lungs, by the small holes pricked in it as was said before. This being continued for a pretty while, the dog, as I expected, lay still, as before, his eyes being all the time very quick and his heart beating very regularly. But upon ceasing this blast, and suffering the lungs to fall and lie still, the dog would immediately fall into convulsive fits; but he as soon revived again by the renewing the fulness of his lungs with the constant blast of fresh air. Towards the latter end of this experiment a piece of the lungs was quite cut off; where it was observable that the blood did freely circulate and pass through the lungs, not only when the lungs were kept thus constantly extended, but also when they were suffered to subside and lie still, which seems to be arguments that, as the bare motion of the lungs, without fresh air, contributes nothing to the life of the animal, he being found to survive as well when they were not moved as when they were; so it was not the subsiding or movelessness of the lungs that was the immediate cause of death or the stopping of the circulation of the blood through the lungs, but the want of a sufficient supply of fresh air."

This celebrated experiment showed that it was the fresh air, and not any alteration in the capacity of the lungs, which caused the renewal of the heart's beat. It has been said that a similar experiment was performed by Vesalius, but with this difference, that whilst Vesalius observed the fact, he failed in giving a rational explanation. He supposed that the movements of the lungs affected the movements of the heart, but he did not see, as Hooke did, that the heart moved because it was supplied with blood containing fresh air. Hooke's experiment is one also of great practical importance as being the basis of the modern practice of using artificial respiration in cases of impending asphyxia.

We thus see that the necessity of a continual supply of fresh air was recognised as being essential to life. It was further surmised that the air imparted something to the blood, and received something in return; but no further advance was made in this direction until the researches of Mayow, a name now famous in the early history of chemistry and physiology. John Mayow was born in 1645, and died at the early age of 34. His principal work was published in Oxford in 1674. In it, by many ingenious experiments, he showed that combustion diminishes the volume of the air and alters its qualities; that respiration also affects the quality of the air; that an animal will die if kept in a confined space full of air, a fact to be explained, according to Mayow, by saying that the animal had used the respirable portion of the air, and that the residue was unfit for life; and finally, he showed that an animal suffers if placed in an atmosphere the qualities of which have been injured by combustion. Further, he gave the name of "nitro-aërial spiritus" to the "principle" in the air, which he said had to do with life, muscular action, and combustion. Thus, he no doubt came near the discovery of oxygen, made by Priestley nearly a century later. It would be difficult to estimate the enormous influence on theories of combustion and of respiration exerted by the researches of Boyle, Hooke, and Mayow. They prepared the way in physiological science for the next great step—namely, the identification of the gaseous elements concerned in respiration. The dependence of progress in physiology on the state of scientific opinion regarding chemical and physical questions could not be better illustrated than in the history of physiological ideas regarding respiration. Thus the researches of Boyle with the air-pump did much to explain the mere mechanism of breathing. Hooke made this even more apparent, and Mayow gave greater precision to the idea that in respiration the blood lost something and gained something. It is difficult to determine precisely, after the lapse of time, the contributions made by each of these distinguished observers, who were contemporaries; but I would venture to say that the germ of the ideas that bore fruit in the minds of Hooke, and more especially of Mayow, may be found in the writings of Robert Boyle.

The researches of Mayow, indicating the existence in the air of a "nitro-aërial spiritus" necessary to life, and the presence in expired air of something deleterious to life, did not immediately produce the fruits one would have expected. At first his writings attracted considerable attention; they passed through two or three

editions, and were translated for Continental readers, but from the beginning of the eighteenth century, nearly twenty years after Mayow's death, they passed almost into oblivion. Thus Hales vaguely refers to him in only two instances, and, as stated by Bostock, "in the discourse delivered by Sir John Pringle before the Royal Society, upon the assignment of Sir Godfrey Copley's medal to Dr. Priestley, which commences with a sketch of the discoveries that had been made in the science of aërology, previous to the period when this philosopher entered upon his experiments, the name of Mayow is not mentioned."

Mayow's writings were first again brought into notice in this country by Reinhold Forster, who gave a summary of Mayow's views in an introduction to his translation of Scheele's Essay on Air and Fire.

As another example of how Mayow's observations were neglected, it may be pointed out that Boerhaave (1668–1738), one of the most learned men of his time, states that he cannot explain the change which the air experiences by respiration, and even Haller, in his great work 'Elementa Physiologiæ Corporis Humani,' published 1766, sums up his knowledge regarding expired air by stating that it is combined with a quantity of water and a noxious vapour, and has its elasticity diminished.

The next step in the physiology of respiration was the discovery in 1754 of carbonic acid by Joseph Black, then Professor of Medicine and Chemistry in this University. About this time there was much discussion in the medical world as to the use of lime water in cases of stone and gravel. It was supposed that the lime water dissolved calculi and assisted in expelling them from the body. A discussion arose as to the virtues of lime water produced from different substances. Two Professors in the University of Edinburgh —Alston and Whytt—specially investigated the subject, and Whytt asserted that the lime water of oyster-shell lime had more power as a solvent than the lime water of common stone lime. This led Black to examine the question. "I therefore," says he, "conceived hopes that, by trying a greater variety of the alkaline earths some kinds might be found still more different by their qualities from the common kind, and perhaps yielding a lime water still more powerful than that of oyster-shell lime."

This led Black to his celebrated investigation on magnesia. He showed that in the case of magnesia alba (carbonate of magnesia) the disappearance of the effervescence on treatment with an acid after heating was accompanied by a loss of weight. The substance thus given off he called "fixed air," or what we now term carbonic acid. This led to an examination of the salts of lime, and in 1757 he made two important physiological discoveries, namely: (1) that the fixed air was injurious to animal life; and (2) that fixed air was produced by the action of respiration. These important observations are thus described in his own words: "In the same year, however, in which my first account of these experiments was published, namely, 1757, I had discovered that this particular kind of air, attracted by alkaline substances, is deadly to all animals that breathe it by the mouth and nostrils together; but that if the nostrils were kept shut, I was led to think that it might be breathed with safety. I found, for example, that when sparrows died in it in ten or eleven seconds, they would live in it for three or four minutes when the nostrils were shut by melted suet. And I convinced myself that the change produced on wholesome air by breathing it consisted chiefly, if not solely, in the conversion of part of it into fixed air. For I found that by blowing through a pipe into lime water, or a solution of caustic alkali, the lime was precipitated, and the alkaline was rendered mild. I was partly led to these experiments, by some observations of Dr. Hales, in which he says that breathing through diaphragms of cloth dipped in alkaline solutions made the air last longer for the purposes of life."

Fifteen years afterwards, namely, in 1772, Joseph Priestley examined the chemical effects produced by the burning of candles and the respiration of animals upon ordinary air: and he made the important discovery that, after air had lost its power of supporting combustion, as by the burning of candles, this property might be restored by the agency of plants. Pushing his experiments still further, he found that air, deteriorated by the breathing of animals, might again become suitable for respiration by the action of plants. In these experiments he employed mice for ascertaining how far an air was impure or unfit for respiration. In 1774 Priestley obtained oxygen by heating red precipitate by means of the sun's rays concentrated by a burning glass. This led to an investigation of the constitution of the atmosphere, and it was shown that it was not a homogeneous elementary body, but consisted of two gases, and that its constitution was remarkably uniform. Priestley showed that by fermentation, combustion, the calcination of metals, and respiration, the air lost a portion of one of its constituents, oxygen.

Thus the chemical researches of Black and Priestley showed that in respiration oxygen was consumed and carbonic acid produced, although the latter fact, owing to the theoretical views of Priestley as to phlogiston, was not fully appreciated by him.

Within a year after Priestley's discovery, a paper on respiration was written by Lavoisier (1743-1794), in which he showed that Priestley was correct in stating that the air lost oxygen in breathing, but Lavoisier specially pointed out that it had gained carbonic acid. No doubt Lavoisier was well acquainted with Black's researches, as is shown by the correspondence between these distinguished men. Lavoisier was the first, however, to make a quantitative examination of the changes produced in the air by breathing. In 1780 he performed a remarkable experiment, in which a guinea-pig was confined over mercury in a jar containing 248 cubic inches of gas consisting principally of oxygen. In an hour and a quarter the animal breathed with much difficulty, and being removed from the apparatus, the state of the air was examined. Its bulk was found to be diminished by 8 cubic inches, and of the remaining 240 inches 40 were absorbed by caustic potash, and consequently consisted of carbonic acid. Still later he performed a more accurate experiment, giving quantitative results. During 1789 and 1790, by a special apparatus, Lavoisier and his friend Séguin attempted to measure the changes in the air produced by the breathing of man. These researches are not of value so much for the results they gave as for the method employed. Lavoisier constructed a still more elaborate apparatus with which he began experiments. This research, however, he never finished, as, in 1794, he fell a victim to the blind fury of Robespierre. It is narrated that he earnestly requested a respite of a few days to give him time to prepare for publication the results of his investigations. This was denied, and thus perished one of the greatest scientific sons of France.

Stephen Hales (1677-1761) attempted to measure the amount of aqueous vapour given off by the lungs by breathing through a flask filled with wood-ashes, which absorbed the moisture, and he estimated the amount at about 20 ounces in twenty-four hours. Similar observations were afterwards made by Menzies and by the eminent surgeon, Mr. Abernethy. Lavoisier also attacked the problem by an indirect method. Thus, he determined the quantity of oxygen consumed and of carbonic acid produced, and, assuming that the amount of oxygen was more than sufficient to form the carbonic acid, he came to the conclusion that the excess united with hydrogen in the lungs, and passed

off as water. As may be supposed, this method gave widely different results.

Various other attempts were made to estimate the amount of the respiratory changes. In particular, Sir Humphry Davy, in March, 1798, investigated the physiological action of nitrous oxide gas. In this research, published in 1800, he began by observations upon animals, and observations as to the effect of the gas on life, on muscular irritability, on the action of the heart, and on the colour of the blood are recorded with great precision. He then passed on to observations on the respiration of hydrogen, and this led him to a repetition of the experiments of Lavoisier and Goodwin. Next he subjected himself to experiment, and gave himself and friends to experiment, and records a number of interesting physiological and psychical phenomena. This research is of great historical interest as being the first leading to the discovery of a method of producing anæsthesia, or insensibility to pain, by breathing vapours or gases.

Another eminent man who contributed largely to the physiology of respiration was Lazarus Spallanzani, who was born in 1729 and died in 1799. He was educated under the direction of the Jesuits. When about 16 years of age he went to Bologna, and studied at that University, specially under the tuition of his cousin Laura Bassa, a woman celebrated in her day for eloquence and scientific knowledge, and who was then a professor in the University. His biographer, Senebier, says: "Under the direction of this enlightened guide he learned to prefer the study of Nature to that of her commentators, and to estimate their value by comparing them with the originals they professed to describe. The scholar at once perceived the wisdom of these counsels, and quickly experienced their happy effects. He evinced his gratitude to his instructress in a Latin dissertation published in 1765, which was dedicated to Laura Bassa, and in which he recounted the applauses she received at Modena when, entering the hall where her pupil, on being appointed a professor, defended a thesis, *de lapidibus ab aquâ resilientibus*, she opposed it 'with the graces of an amiable woman and the wisdom of a profound philosopher.'"

Spallanzani became Professor of Logic, Mathematics, and Greek in Regio in 1754, and about this date he published researches on Infusoria. In 1760 he became Professor in the University of Modena. In 1765 he showed that many microscopic animalcules were true animals, and in 1763 he published his celebrated researches on the reproduction of portions of the body removed from worms, snails, salamanders, and toads. He paid special attention to the great question of spontaneous generation, showing that infusions of animal and vegetable substances exposed to a high temperature, and hermetically sealed, never produced living things. He also investigated respiration, more particularly in invertebrates. He showed that many such animals breathed by means of the skin as well as by the special breathing organs. He placed many animals, but more especially different species of worms, in atmospheres of hydrogen and nitrogen, and showed that, even in these circumstances, carbonic acid was produced. He also showed the production of carbonic acid by the dead bodies of such animals, and reasoned from this that the carbonic acid was produced directly from the dead tissues and not from the action of the oxygen of the air. He contrasts the respiration of cold-blooded and warm-blooded animals, and shows the peculiarities of respiration in hibernating animals. Nor were these by any means superficial observations. They were usually quantitative, and by the use of the eudiometer, he analysed the air before and after respiration. Probably the most important contribution made by Spallanzani to the subject was showing what he states in the following paragraph:—

"I inquire not here why the quantity of carbonic acid gas was greater in azotic and hydrogen gas than in common air. I shall only conclude, from these experiments, that it is clearly proved that the carbonic acid gas produced by the living and dead snails in common air resulted not from atmospheric oxygen, since an equal and even a greater quantity of it was obtained in azotic and hydrogen gas; consequently, in the oxygen gas destroyed by the presence of these animals, its base alone is absorbed by them either during life or after death."

But Spallanzani supposed that the carbonic acid thus produced was formed by digestion in the stomach, passed through the tissues, and was then exhaled. Thus he missed a great step in discovery—namely, that the carbonic acid is produced by the tissues themselves. It was, however, pointed out in 1823 by W. F. Edwards, in his work on the 'Influence of Physical Agents in Life,' that the amount of carbonic acid produced by animals breathing was too great to be accounted for by the amount of oxygen in their lungs at the beginning of the experiment, or by carbonic acid supposed to be in the stomach. The importance of this observation will be seen when we discuss the phenomena of the breathing of the tissues.

In 1809 the subject of aquatic breathing was investigated with great care by Provençal and Humboldt. They collected and analysed the gases of water before and after fishes had lived in it for a certain time, and showed that oxygen was consumed and carbonic acid produced by these creatures.

We have now seen how gradually knowledge was arrived at as to the respiratory exchanges. At the beginning of the present century it was recognized that expired air had lost oxygen, gained carbonic acid and aqueous vapour, and had become hotter. Since then many researches have been carried on to determine with accuracy the quantities of these substances. In all of these, the method followed has been to draw through a chamber containing the animal, a steady, constant stream of air, the quantity and composition of which are known. Thus, suppose a certain quantity of dry air, free from carbonic acid, and consisting only of oxygen and nitrogen, is passed through such a chamber. In the chamber some of the oxygen is consumed, and a certain amount of carbonic acid and of aqueous vapour is given up by the animal. The air is drawn onwards through bulbs or glass tubes containing substances such as baryta water to absorb the carbonic acid, and chloride of calcium or sulphuric acid to absorb the aqueous vapour. It is evident that the increased weight of these bulbs and tubes, after the experiment has gone on for some time, will give the amounts of carbonic acid and aqueous vapour formed. Thus Andral and Gavarret in 1843, Vierordt in 1845, Regnault and Reiset in 1849, von Pettenkofer in 1860, and Angus Smith in 1862, determined the quantities both by experiments on animals and on human beings.

The results are—first, the expired air, for its own temperature, is saturated with aqueous vapour; secondly, the expired air is less in volume than the inspired air to the extent of about one-fortieth of the volume of the latter; thirdly, the expired air contains about 4 per cent. more carbonic acid and from 4 to 5 per cent. less oxygen than inspired air; fourthly, the total daily excretion of carbonic acid by an average man amounts to 800 grams in weight, or 406 litres in bulk. This amount of carbonic acid represents 218·1 grams of carbon and 581·9 grams of oxygen. The amount of oxygen, however, actually consumed is about 700 grams; so that nearly 120 grams of oxygen absorbed are not returned by the lungs, but disappear in the body. It must be remembered, however, that carbonic acid escapes by the skin and other channels. These figures may be taken as averages,

and are subject to wide variations depending on nutritional changes.

There is, however, another side of the problem of respiration—namely, a consideration of the chemical changes involved in the process.

According to Lavoisier, respiration was really a slow combustion of carbon and of hydrogen. The air supplied the oxygen, and the blood the combustible materials. The great French chemist, however, did not entirely commit himself to the opinion that the combustion occurred only in the lungs. He says that a portion of the carbonic acid may be formed immediately in the lung, or in the blood-vessels throughout the body, by combination of the oxygen of the air with the carbon of the blood. Lavoisier's opinions were understood correctly by only a few of his contemporaries, and a notion prevailed that, according to him, combustion occurred only in the lungs, and that the changes in these organs were the main sources of animal heat. Such a notion, however, was contrary to the opinion of the great mathematician Lagrange, announced in 1791, a few years after the first publication of Lavoisier's on respiration. Lagrange saw that, if heat were produced in the lungs alone, the temperature of these organs might become so high as to destroy them; and he therefore supposed that the oxygen is simply dissolved in the blood, and in that fluid combined with carbon and hydrogen, forming carbonic acid and aqueous vapour, which were then set free in the lungs. It will be observed that this opinion of Lagrange in 1791 was practically the same as that stated by Lavoisier in 1789.

Now, if the production of carbonic acid in a given time depends upon the amount of oxygen supplied in the same time, these views of Lavoisier and Lagrange would be correct; but Spallanzani had shown that certain animals confined in an atmosphere of nitrogen or of hydrogen exhaled carbonic acid to almost as great an extent as if they had breathed air. He was therefore obliged to say that carbonic acid previously existed in the body, and that its appearance could not be accounted for by the union of oxygen with the carbon of the blood. Spallanzani therefore thought that in the lung there was simply an exhalation of carbonic acid and an absorption of oxygen. These views were supported by the experiments of W. Edwards, published in 1824. Edwards showed that animals in an atmosphere of hydrogen produced an amount of carbonic acid not to be accounted for by any oxygen supposed to exist free in the body. In 1830 Collard de Martigny performed many similar experiments, and stated that carbonic acid was secreted in the capillaries and excreted by the lungs. This opinion was supported by Johannes Müller, who repeated the experiments of Spallanzani.

It might thus be said that two theories of respiration were before physiologists—the one, that combustion occurred in the lungs or venous blood, furnishing carbonic acid and aqueous vapour, which were exhaled by the lungs; the other, that there was no such combustion, but that oxygen was absorbed by the lungs and carried to the tissues, whilst in these carbonic acid was secreted, absorbed by the blood, carried to the lungs, and there exhaled. Some writers, soon after Lavoisier, misunderstood, as I have already stated, the opinions of that distinguished man, and taught that in the lungs themselves there was a separation of carbon, which united immediately with the oxygen to form carbonic acid. But this was not really Lavoisier's opinion; and we have to do, therefore, with two theories, which have been well named—the theory of combustion and the theory of secretion.

The difficulty felt by the older physiologists in accepting the secretion theory was the absence of proof of the existence of free oxygen and carbonic acid in the blood. This difficulty also met those who rejected the notion of combustion occurring in the lungs, and substituted for it the idea that it really occurred in the blood throughout the body, because, if this were true, free gases ought to be found in the blood. Consequently, so long as physiologists had no definite knowledge regarding gases in the blood, the combustion theory, in the most limited sense, held its ground. This theory, although fruitful of many ideas regarding respiration and animal heat, was abandoned in consequence of the evidence afforded by two lines of inquiry—namely, researches regarding the gases of the blood, and researches as to the relative temperature of the blood in the right and left cavities of the heart.

Let me first direct your attention to the gradual development of our knowledge regarding the gases of the blood. The remarkable change in the colour of the blood when it is exposed to, or shaken up with, air, was observed so long ago as in 1665 by Fracassati, and is also alluded to by Lower (1631–1691), Mayow, Cigna (1773), and Hewson (1774); but Priestley was the first to show that the increased redness was due to the action of the oxygen of the air, and that the blood became purple when agitated with carbonic acid, hydrogen, and nitrogen. The presence of gas in the blood was first observed about 1672 by Mayow. I find in a paper of Leeuwenhoek (1632–1723), entitled "The Author's Experiments and Observations respecting the quantity of air contained in Water and other Fluids," published in 1674, a description of a method devised by this ingenious man for detecting the existence of air in certain fluids, and amongst them in the blood. It consisted of a kind of syringe, by which he was able to produce a partial vacuum. He then observed bubbles of gas to escape, and he estimated, in the case of human blood, that the air in the blood amounted to $\frac{1}{1000}$ or $\frac{2}{1000}$ part of the volume of the blood. He argues, from this interesting observation, against one of the prevalent medical theories of the time, that various diseases were caused by fermentations in the blood. How, said he, was such a theory consistent with the existence of so small a quantity of gas? He made the mistake, from the inefficiency of his apparatus, of stating that blood, when it issues from the veins, contains no air.

Gas was also obtained from the blood in 1799 by Sir Humphry Davy, in 1814 by Vogel, in 1818 by Brand, in 1833 by Hoffmann, and in 1835 by Stevons. On the other hand, John Davy, Bergman, Johannes Müller, Mitscherlich, Gmelin, and Tiedeman failed in obtaining any gas. The first group of observers, either by heating the blood, or by allowing it to flow into a vacuum, or by passing through it a stream of hydrogen, obtained small quantities of carbonic acid. Sir Humphry Davy was the first to collect a small quantity of oxygen from the blood. John Davy, by an erroneous method of investigation, was led, in 1828, to deny that the blood either absorbed oxygen or gave off carbonic acid. He was shown to be wrong in 1830, by Christison, who devised a simple method of demonstrating the fact.

So long as the evidence in favour of the existence of gases in the blood was so uncertain, the combustion theory of respiration held its own. At last, in 1836, appeared the researches of Heinrich Gustave Magnus, latterly Professor of Physics and Technology in the University of Berlin. He first attempted to drive off carbonic acid from the blood by a stream of hydrogen, and thus obtained as much as 34 cubic centimètres of carbonic acid from 62·9 cubic centimètres of blood. He then devised a mercurial air-pump, by which it was possible to exhaust a receiver to a much greater extent than could be done by the ordinary air-pump. When blood was introduced into such a vacuum, considerable quantities of carbonic acid, oxygen, and nitrogen were obtained. This research marks an epoch in physiological discovery, as it threw a new light on

the function of respiration, by demonstrating the existence of gases in the blood.

In order to appreciate the value of this evidence, and the method employed, let me direct your attention to the laws regulating the diffusion of gases. As a mass of gaseous matter has no independent form, like that of a solid body, nor a fixed volume like that of a liquid, but consists of an enormous number of molecules which, in consequence of their mutual repulsions, endeavour more and more to separate from each other, it is easy to see that if two masses of gas are brought into contact, they will mix, that is, their molecules will interpenetrate, until a mixture is formed containing an equal number of the molecules of each gas. The force by which the molecules repel each other, and by which they exercise pressure in all directions, is known as the pressure or tension of the gas. It is evident that the greater the number of gas molecules in a given space, the greater will be the tension of the gas, and from this it follows that the tension of a gas is in the inverse proportion to its volume (this is known as Boyle's law). Suppose now that two gases are separated by a porous partition; the two gases will mix, and the rapidity of the diffusion will vary according to the specific weight of the gases. Thus light gases, like hydrogen or coal gas, will diffuse more quickly than air, or chlorine, or carbonic acid.

It is important also to note the laws regulating the absorption of gases by fluids. If we allow a little water to come into contact with ammonia gas above mercury, the gas is rapidly absorbed by the water (1 volume of water absorbs 730 volumes NH_3), all the gas above disappears, and in consequence of this the pressure of the outer air drives up the mercury in the tube. The higher the temperature of the fluid the less gas it absorbs. At the boiling point of the fluid its absorption = 0, because at that temperature the fluid itself changes into gas. The power of absorption of different fluids for the same gas and the absorptive power of the same fluid for different gases fluctuate between wide limits. Bunsen defined the co-efficient of absorption of a fluid for a gas as that number which represents the volume of gas (reduced to 0° and 760 mm. barometric pressure) which is taken up by 1 volume of the fluid. Thus 1 volume of distilled water takes up the following volumes:

Temp. Cent.	N.	O.	CO_2	Air.
0	0·02	0·041	1·797	0·025
5	0·018	0·036	1·5	0·022
15	0·015	0·03	1·002	0·018
37	—	0·02	0·569	—

Again, 1 volume of distilled water at 0° C. absorbs 0·00193 volumes of hydrogen, while it can take up no less than 1180 volumes of ammonia; again, 1 volume of water at 0° C. absorbs only 0·2563 volumes of olefiant gas, but 1 volume of alcohol, at the same temperature, will take up as much as 3·595 volumes. The volume of gas absorbed is independent of the pressure, and the same volume of gas is always absorbed, whatever the pressure may happen to be. But, as according to Boyle's law the density of a gas, or in other words the number of molecules in a given space, is in proportion to the pressure, and as the weight is equal to the product of the volume and the density, so while the volume absorbed always remains the same, the quantity or weight of the absorbed gas rises and falls in proportion to the pressure (this is the law of Dalton and Henry). It therefore follows that a gas is to be considered as physically absorbed by a fluid, if it separates from it not in volumes but in quantities, the weights of which are in proportion to the fall of pressure.

When two or more gases form an atmosphere above a fluid, the absorption takes place in proportion to the pressure which each of the constituents of the mixture would exercise if it were alone in the space occupied by the mixture of gases, because, according to Dalton's law, one gas does not exercise any pressure on another gas intermingled with it, but a space filled with one gas must be considered, so far as a second gas is concerned, as a space containing no gas, or in other words, a vacuum. This pressure, which determines the absorption of the constituents of a gaseous mixture, is termed, according to Bunsen, the partial pressure of the gas. The partial pressure of each single gas in a mixture of gases depends then on the volume of the gas in question in the mixture. Suppose atmospheric air to be under a pressure of 760 mm. of mercury, as the air consists of 21 volumes per cent. of O and 79 volumes per cent. of N, then $\frac{760 \times 21}{100} = 159{\cdot}6$ mm. of mercury, will be the partial pressure under which the oxygen gas is absorbed, while the absorption of nitrogen will take place under a pressure of $\frac{760 \times 79}{100} = 600$ mm. of mercury. Suppose, again, that above a fluid containing a gas, say carbonic acid, which has been absorbed, there is an atmosphere of another gas, say atmospheric air, then as carbonic acid exists in the air only in traces, its tension is equal to zero, and carbonic acid will escape from the fluid until the difference of tension between the carbonic acid in the water and the carbonic acid in the air above it has been balanced, that is, until the carbonic acid which has escaped into the air has reached a tension equal to that of the gas still absorbed by the fluid. By the phrase "tension of gas in a fluid" is understood the partial pressure in millimètres of mercury which the gas in question has to exercise in the atmosphere, when no diffusion between the gas in the fluid and the gas in the atmosphere takes place. The terms "pressure" and "tension" mean the same thing.

(*To be continued.*)

Review.

THE THERMAL BATHS OF BATH, their History, Literature, Medical and Surgical Uses and Effects, together with the Aix Massage and Natural Vapour Treatment. By HENRY WILLIAM FREEMAN, Surgeon to the Royal United Hospital, Bath.*

This work is not merely a new edition of the admirable manual written some years ago by the late Dr. Falconer, although it comprises the essential features of that publication in the chapters dealing with the mineral springs of Bath and the medicinal uses and effects of the water. The treatment of these subjects by the author has however been considerably amplified, and full regard has been paid to the recent advances and improvements which have been introduced in the application of the Bath water for the remedy of disease. In addition to the very full information given on these subjects, the history of Bath as a spa has been very fully dealt with, since the author justly considered that the historic interest attaching to the thermal springs of Bath was such as to justify more ample treatment than it has hitherto obtained. The first four chapters of the work are therefore devoted to an historical account of the baths from the time of the Roman occupation, and to biographical notices of the physicians who have been prominently connected with the use of the Bath water. These chapters contain a vast amount of interesting information, derived from various sources, and for the convenience of those who may desire to pursue the subject more fully, a list of works relating to Bath and its mineral waters is added. This portion of the work is rendered more complete by the introduction of admi-

* London: Hamilton, Adams and Co., 1888. Crown 8vo., Pp. i–xxiii., 1–379, and index.

rably executed reproductions of the "Oldest Map of the City," from the Soane MSS., of Lucas' Plan of the Roman Baths, discovered in 1755, and of the plan by Hoare in the British Museum, which was taken immediately after the discovery of the Roman remains. In connection with this part of the subject there is also in the appendix an account of the baths of Pompeii, with a plan of the baths of Caracalla at Rome, which were contemporary with those of Bath. Due attention has, therefore, been devoted to the historic aspect of the Bath thermal springs, and it seems only reasonable that this should be, for in that respect alone they are probably unique.

Of late years great changes have been made in the bathing establishments, and the corporation of the city, in pursuance of the duty with which it was entrusted by Queen Elizabeth's charter, has made great advances in providing for the comfort of persons using the baths. At the present time the arrangements of this kind are such as to excel those in existence at any Continental spa, and it is the determination of the municipality to continue its exertions, so that in all other respects of a more extraneous nature Bath may be fully able to compete with its Continental rivals. It is with this object that the modern appliances for massage and various modes of using the water have been introduced, and a full account of these systems is given by Mr. Freeman in chapter six of his work. From the fact that the number of visitors using the Bath water during the past ten years has largely increased it may be inferred that this enlightened policy has been the means of securing a more adequate appreciation of Bath and the Bath thermal water for curative purposes.

The descriptions of the present bathing establishments are excellently illustrated by Woodburytype plates and plans, and for the convenience of strangers visiting Bath there is also a map of the immediate precincts of the baths, showing the situation of the grand pump room, the royal private baths, and the new royal baths attached to the hotel.

The remaining chapters of the work are devoted to the subjects of bathing from a therapeutical point of view, the medical aspects of Bath and the use of the water for medical and surgical purposes, the varied modes of applying baths, and to the consideration of the diseases in which the use of the Bath water is beneficial. Incidental reference is also made to the waters of continental spas and those of Saratoga, which will afford opportunity for judging of their relative value as compared with the water of Bath. Altogether, the work has been very carefully compiled by Mr. Freeman, and it cannot fail to be valuable as a guide and companion to those who desire to seek relief for their bodily ailments by the use of the Bath thermal water.

Obituary.

Notice has been received of the death of the following:—

On the 3rd of August, Mr. Theophilus Aston Wedge, Chemist and Druggist, Wolverhampton. Aged 45 years.

On the 10th of August, Mr. William Holmes, Chemist and Druggist, formerly of Westbourne Grove, W. Aged 72 years.

On the 11th of August, Mr. George Thomas Warner, Chemist and Druggist, Malls, Clifton, Bristol. Aged 59 years.

On the 11th of August, Mr. Charles Clarke, Chemist and Druggist, Hackney. Aged 60 years.

On the 12th of August, Mr. Thomas White, Chemist and Druggist, Church Street, Launceston. Aged 53 years. Mr. White had been a Member of the Pharmaceutical Society since 1876, and had for several years filled the office of Local Secretary.

On the 15th of August, Mr. Thomas Smyth, Chemist and Druggist, Islington, Liverpool. Aged 44 years.

On the 17th of August, Mr. William Williams, Chemist and Druggist, Crown Street, Liverpool. Aged 50 years.

On the 18th of August, Mr. William Denham, Chemist and Druggist, Richmond, Yorkshire. Aged 66 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

'Nature's Hygiene.'

Sir,—I wish to call attention to a confusion made by your reviewer, which, unless it be removed, may injure certain commercial interests. He should have written "Kingzett's Bactericides," *not* "Sanitas Bactericides."

C. T. Kingzett.

Carbonic Acid as a Factor in the Hardness of Water.

Sir,—The writer of the review, in your last number, of Kingzett's 'Nature's Hygiene,' takes to task the author of that book on the ground that its style is often "somewhat loose," and cites as an example the statement that part of the so-called hardness of water is due to carbonic acid.

Now while looseness of style is to be discouraged, looseness, as regards matter of fact, is to be deplored. If your reviewer is really unaware that the presence of carbonic acid in water does largely influence its "hardness" let me recall to his memory that the alkaline compounds of oleic acid are readily decomposed by this acid, and suggest the repetition of an experiment made to-day, which gave the following results:—

	Degrees of Hardness. (Clarke)
Freshly distilled water:	0°·8
Same water saturated with carbonic acid and examined at 17° C.	16°·0

Dublin. Harry Napier Draper.

[*** Our correspondent would appear to be under a misapprehension if he supposes the experiment suggested by him has anything to do with the "hardness" of water or with the method by which that character is determined. We may remind him that one of the conditions insisted upon by Dr. Clark as essential was the careful removal of the carbonic acid, which would otherwise interfere with the soap test.—Ed. Pharm. Journ.]

Messrs. Hyde, Tandy and Mahon.—No report of the case you refer to has appeared in this Journal.

Aconite.—No. 1 is *R. sanguineus, β viridis.* A stem leaf and a radical leaf should always, if possible, be sent with plants of this genus and the specimen should be in fruit.

W. J. Shepperd.—(1) *Chlora perfoliata.* (2) *Polygonium aviculare.* (3) *Artemisia vulgaris.* (4) *Campanula Trachelium.* (5) *Campanula rotundifolia.*

T. C. R.—The only explanation possible seems to be that a dirty bottle had been used. Neither of the ingredients would appear to be capable of giving rise to the odour.

Lonatus.—An explanation of the reaction will be found in Fresenius's 'Analysis' under the head "magnesia."

J. Brown.—Try distilled water.

Communications, Letters, etc., have been received from Messrs. Robinson, Hart, Alcock, Hopkins, T. C. R.

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The Chemist and Druggist, Dec. 3, 1887.

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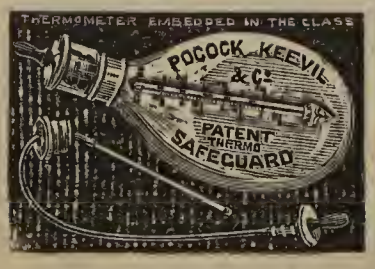

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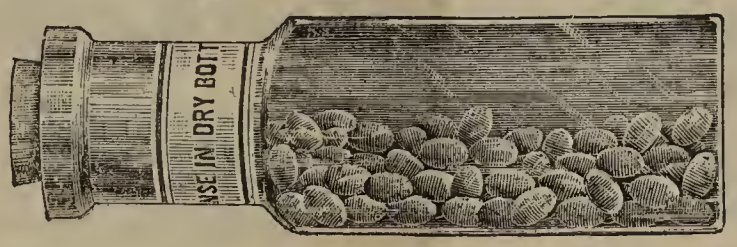
EXACT  SIZE.

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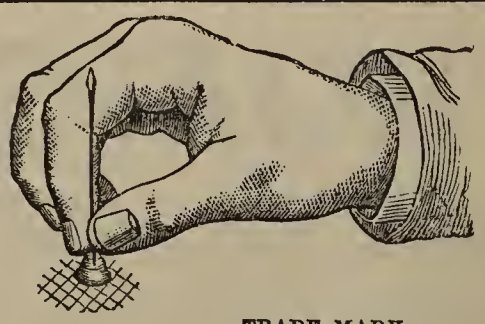

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The WINTER SESSION of 1888-89 will commence on Oct. 1, when an introductory address will be delivered by Dr. Cullingworth, at 3 p.m.

Two entrance science scholarships of 125 guineas and 60*l.* respectively, open to all first-year students, will be offered for competition. The examination will be held on the 26th, 27th, and 28th September, and the subjects will be chemistry and physics, with either botany or zoology, at the option of candidates.

Special classes are held throughout the year for the "Preliminary Scientific" and "Intermediate M.B." examinations of the University of London.

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Assistant Surgeons—Mr. Reeves; Mr. C. Mansell Moullin; Mr. Hurry Fenwick; Mr. F. S. Eve.
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The SESSION 1888-89 will commence on Monday, October 1st, 1888. An old Student's Dinner, which will take the place of an opening ceremony, will be held in the New Library at 7.30 p.m. The Chair will be taken by Jonathan Hutchinson, Esq., F.R.S. The New Buildings, which were opened by their Royal Highnesses the Prince and Princess of Wales, on May 21st, 1887, afford more than double the accommodation which was provided formerly.

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The Evening Class will meet at **8 p.m. on August 27th.**

The Afternoon and Once-a-week Classes will meet at **2 p.m. on August 28th.**

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Mr. S. RATCLIFFE, Southport.
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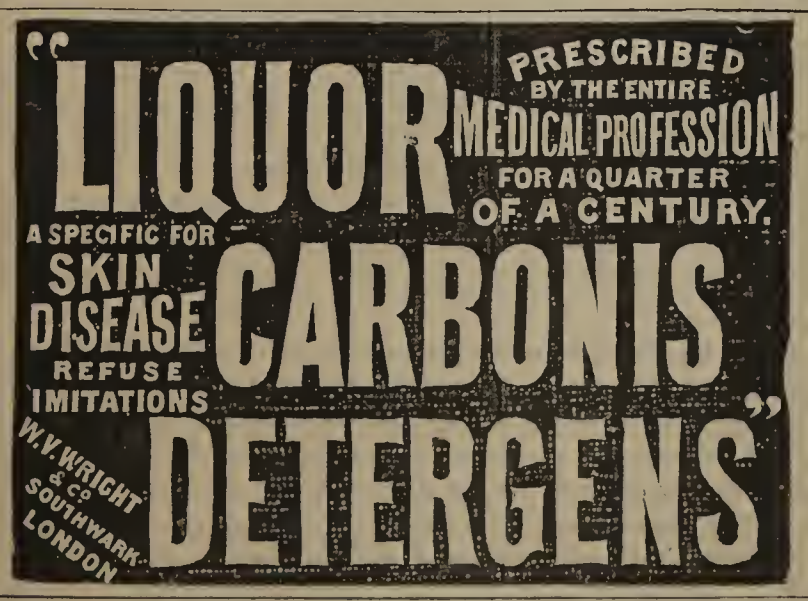

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 949.] SATURDAY, SEPTEMBER 1, 1888. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

SPECIAL NOTICE.

The Society's Libraries and Museums in London and Edinburgh will not be open in the evening during August and September. The Library and Museum in London will be closed during the first fortnight in September. The Library and Museum in Edinburgh will be closed from August 20th to September 4th, both dates inclusive.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

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This Examination will be held throughout Great Britain, at 11 a.m., on the **second Tuesday** in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

THE BRITISH PHARMACEUTICAL CONFERENCE.

ANNUAL MEETING, 1888.

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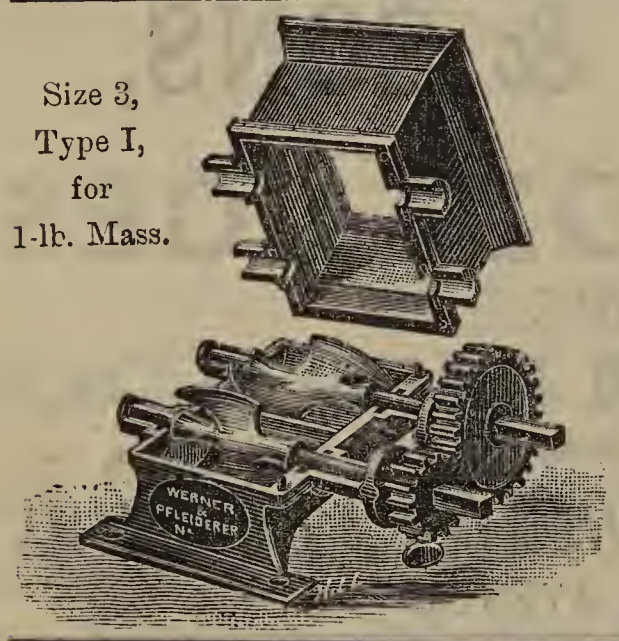

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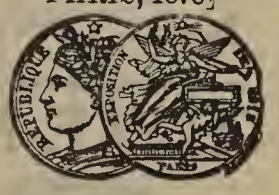

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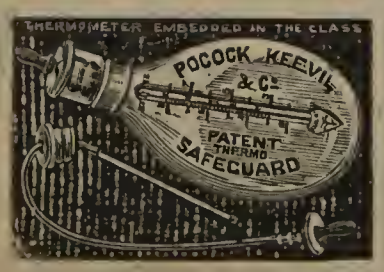

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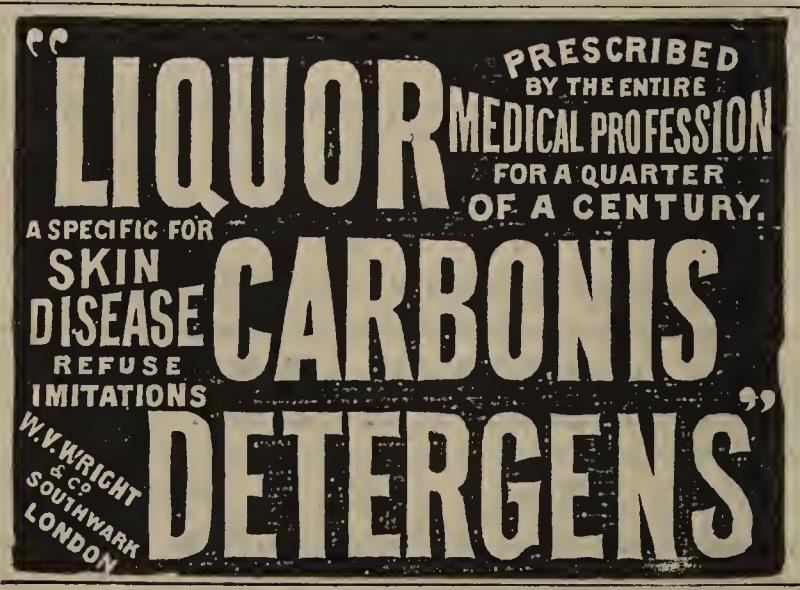

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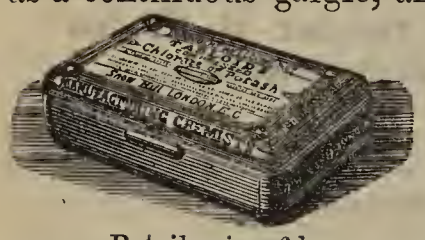

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"A popular remedy, sometimes successful in mild cases of incipient inflammatory sore throat, is a small piece of nitre allowed to dissolve slowly in the mouth" (Waring). An excellent saline for throat cases, having very marked local efficacy when slowly dissolved on the tongue. It is a popular remedy, and for mild inflamed sore throat its ancient reputation is deserved."

Directions.—One or more (5 gr.) Tabloids should be dissolved slowly in the mouth for the local effect.

Supplied to the Trade in bottles of 100 at 14*s*. per doz. Retail, 1*s*. 6*d*. each.

Tabloids of Compressed Chlorate of Potash with Borax.

The Tabloids afford an agreeable form in which to prescribe Chlorate of Potash and Borax.

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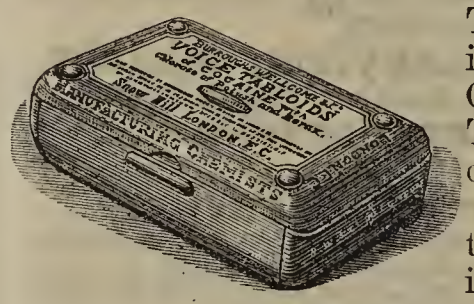
Voice Tabloids contain COCAINE, CHLORATE OF POTASH and BORAX.



The most agreeable form in which to administer Cocaine is in the Voice Tabloids with Chlorate of Potash and Borax.

These Tabloids clear the voice and impart to it a silvery tone.

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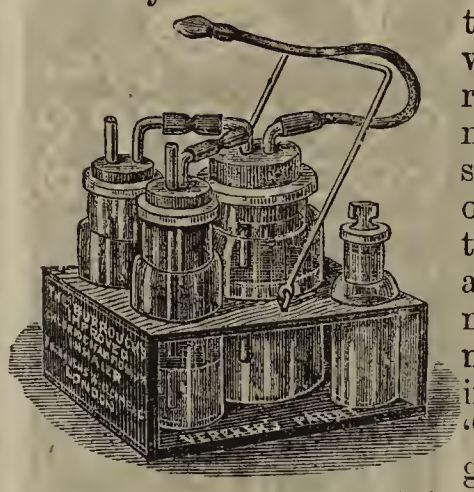
"The vapour of Chloride of Ammonium removes unhealthy and offensive secretions, and restores the long diseased or weakened nasal and respiratory mucous membrane to a healthy state, so that in cases of catarrh, where thickening, induration and irritation exist, a most decided improvement is brought about in a short time." In "throat-cough," pharyngeal irritation, and relaxation and weakness of the throat, it acts as a most effective alterative and tonic to the mucous membrane.



The Burroughs Chloride of Ammonium Inhaler affords perfectly neutral fumes, and is always ready for use.

Dr. FRANKS, Dublin University, says:—"It is the best I have ever used, and I think I have tried all."

Dr. SMYLY, Ex-Pres. Royal College of Surgeons, Ireland, says:—"It is the best Inhaler for Chloride of Ammonium I have met with."

Supplied to the Trade at 7*s*. 6*d*. each. Retail, 10*s*. each.

Supplied by all Wholesale Houses throughout the World.

BURROUGHS, WELLCOME & CO., Snow Hill Buildings, LONDON, E.C.

"THE MONTH."

Tertiary Amyl Nitrite.

The substitution in therapeutics of the ordinary amyl nitrite by another nitrite obtained by treatment of tertiary amylic alcohol, is recommended by Messrs. Bals and Broglio (*Nouv. Rém.*, June, p. 249). It is stated that this tertiary nitrite possesses all the physiological and therapeutic properties of the primary nitrite, but that its action is more marked and permanent, whilst it does not cause flushing of the face and can be inhaled in considerable quantities (80 to 100 drops daily) without danger. The compound referred to appears to be the nitrous ether of dimethylethyl carbinol, better known under the name "amylene hydrate." It is described as being a very mobile amber-coloured liquid, lighter than water, having an odour recalling those of camphor and terpin. It is insoluble in water, slightly soluble in glycerine, and very soluble in ether, alcohol and chloroform.

Physostigmine.

In an interesting paper on physostigmine (*Pharm. Zeit.*, Aug. 15, p. 483) Herr Eber states that gold chloride, the double iodide of potassium and bismuth and the double iodide of potassium and zinc are such delicate precipitants of this alkaloid from a solution of the sulphate as to make it perceptible on a white plate if only 0·000001 gram be present, a quantity not recognizable by the physiological test. A drop of physostigmine solution containing the same quantity, if brought into contact on a white surface with a drop of 5 per cent. solution of potash or soda, shows at the point of contact a red colour, similar to that of oxyhæmoglobin or picrocarmine, due to the formation of rubreserine. After the drop dries up a yellow mass is left that dissolves again with the red colour. If baryta water be used the carmine colour is produced at first and then it changes to dark blue. The formation of rubreserine, the oxidation product of physostigmine, is not so simple as has generally been supposed, a volatile strongly alkaline base separating at the same time, which, like rubreserine, has no action on the pupil. Neither rubreserine, the blue compound, nor the volatile base were found in the urine of an animal to which physostigmine had been administered, but a base was separated closely resembling physostigmine except that it was inactive on the pupil. This same inactive base has been separated from samples of commercial physostigmine and is formed upon boiling a neutral solution of physostigmine. There are reasons for thinking that physostigmine is not converted directly into rubreserine by boiling or by exposure to sunlight, but that it is formed under these conditions from this more unstable "inactive physostigmine." If therefore a solution of commercial physostigmine became red soon after its preparation Herr Eber would attribute the change to the presence of inactive physostigmine in the sample.

Morphine.

A condition under which the presence of morphine might be obscured is reported by the editor of the *Pharmaceutical Era* (Aug., p. 292). Morphine had been withdrawn from a complex solution by shaking with amylic alcohol and the extract had been allowed to evaporate spontaneously. Upon treating the amorphous residue with a little water it dissolved completely, developing at the same time a strong smell of amylic alcohol, which was not previously perceptible. After a few minutes the solution was passed through a filter and it was not till subsequently that the morphine crystallized out. It is suggested that the morphine had formed with amylic alcohol a compound that was decomposed by water, and either a hydrate was not formed at once or that it remained for a time in the condition of a supersaturated solution.

Cortex Frangulæ and Cascara Sagrada.

The bark of *Rhamnus Frangula* has been worked upon by several investigators, and among others Faust stated that he had obtained from it frangulin, a glucoside, and frangulic acid, the latter being a decomposition product of the former. In a recent paper (*Archiv der Pharm.*, July, p. 569) Herr Schwabe confirms the presence of frangulin, which, however, he represents by the formula $C_{21}H_{20}O_9$, and identifies the compound described by Faust under the designation "frangulic acid" with the emodin of rhubarb. The other product of the breaking up of the glucoside is an unfermentable sugar, probably identical with rhamnodulcite. The decomposition is represented by the equation—

$$\underset{\text{Frangulin.}}{C_{21}H_{20}O_9} + H_2O = \underset{\text{Emodin.}}{C_{15}H_{10}O_5} + C_6H_{12}O_5.$$

As bearing upon the requirement of the B.P. that *Rhamnus Frangula* bark shall be kept at least one year before being used it may be stated that from fresh bark Herr Schwabe failed to obtain any frangulin and at most only traces of emodin. From cascara sagrada, the bark of *Rhamnus Purshiana*, he obtained emodin, but no frangulin, although he admits the former might possibly be met with in older samples of bark. The crystalline body met with by Professor Wenzell he considers to have been emodin, and therefore incorrectly described as a glucoside.

Arganin.

A new bitter principle named "arganin" has been obtained by Mr. S. Cotton from the kernels of the argan nut. It is extracted from the cake after expression of the oil by means of hot 90 per cent. alcohol. Ether is then added to the filtered liquid by degrees so as to promote the crystallization of the bitter principle. These crystals are then purified by solution and recrystallization from boiling absolute alcohol. Arganin appears to be very hygroscopic, since the moisture of the atmosphere is sufficient to reduce the crystals to a viscous consistence. It forms a definite compound with sulphuric acid, crystallizing in elongated prisms. Arganin is insoluble in ether, oils, and sulphide of carbon, but is easily soluble in water (*Rép. de Pharm.*, p. 247).

Rhus glabra.

Under the heading of "Analyses of American Plants," the *American Journal of Pharmacy* (Aug., page 389) gives some abstracts from theses referring to *Rhus glabra*, *Helianthemum canadense* and *Pilea pumila*. The first was found to contain a varying amount of tannin and a colouring matter allied to if not identical with that of quercitron bark; the leaves collected in Iowa giving in July 16·36 per cent. of tannin, and in August 15·75 per cent., being less than the amount obtained from leaves grown in Virginia. *Helianthemum canadense* yielded 10·8 per cent. of tannin, and indications of the presence of a glucoside, a crystalline substance, separating in needles from benzol, being found in the plant. *Pilea pumila*, commonly known as "clear-

weed," or "richweed," is a plant that grows from Canada to Florida, and has a reputation for counteracting the effect produced by *Rhus Toxicodendron*. The alcoholic tincture evaporated spontaneously, yielded crystals responding to the tests for glucosides. Chloroform removed from an aqueous extract made from the residue from the evaporation of a spirituous tincture, a substance having a strong vanilla-like odour, but which did not respond to the tests for either alkaloids or glucosides.

Sutherlandia frutescens.

Some months since this plant was sent to this country as a remedy for cancer. Professor MacOwan, however, does not appear to have a high opinion of its value, for, writing to the *Cape Times*, he says: "It is certainly a surprise to find any medical virtue attributed to the Sutherlandia. From microscopic investigation of degenerated cancer tissue I entertain little hope of a successful result. The plant used by the natives, and by them pointed out to the old Dutch colonists as a remedy or palliative, is quite different, and certainly has some powerful properties. It is *Melianthus major*, L., known as kruidje-voer-mij-niet, *i.e.*, herb touch-me-not, from its heavy fetid smell. This plant belongs to the *Sapindaceæ*. It was exhibited at the Colonial and Indian Exhibition by Dr. C. T. Juritz and the Rev. G. Hettasch, and in the Cape of Good Hope Catalogue is mentioned as 'an excellent external remedy in tinea capitis, crusta serpiginosa, necrosis and foul ulcers; also useful as a gargle and lotion in sore throat, and in diseases of gums, and the bruised leaves applied to ulcers promote granulation.'" Dr. Pappe, in the 'Flor. Capensis Med. Prodr.,' writes as follows concerning it: "I am indebted to my friend, Dr. A. Brown, for the following practical remarks on the medical properties of this plant:—For many years past I have found the *Melianthus major* very serviceable in necrosis and foul ulcers, and its effect in promoting granulation is very remarkable. After cleaning the sores with the decoction, some of the boiled leaves are applied to the parts and found to answer well. I have not only used it with decided benefit, but in many cases where the materia medica has failed me or the degree of healing was not satisfactory, it has almost invariably succeeded. In carcinoma I have seen it applied with effect in cleaning the ulcers and rendering their otherwise highly disagreeable odour less offensive. In indolent leprous sores it can also vie with the other applications in that intractable disease. I have tried it in tinea capitis with great effect, but in other affections of the skin it has failed to satisfy me whether it did good or not." The above remarks seem to point to some antiseptic principle in the plant, which might possibly be worthy of investigation. The plant appears to be common in the Cape Flats and other parts of the colony, and it is not unfrequently grown in Botanic Gardens on account of its handsome, glaucous foliage. Another species, *Melianthus comosus*, appears to be used in the same way.

Melianthus major.

In an extract taken from the Demerara *Argosy* (*Gard. Chron.*, August 11, p. 156) the white cedar of British Guiana is identified with *Tabebuia longipes* of the natural order *Bignoniaceæ*. In the late Colonial and Indian Exhibition this bark was exhibited in the British Guiana Court among other medicinal products as a remedy for syphilis, but it was not then botanically identified. The tree has been described and figured in Hooker's 'Icones Plantarum' (vol. viii., pt. 2, pl. 1738). The medicinal properties of the different genera of this family are so imperfectly known that even so small an addition to our knowledge may be welcomed. Hitherto the properties of some of the plants of the natural order have been given as alterative, astringent, febrifuge, but especially diuretic and diaphoretic. Lately also an African plant of this family, *Newbouldia lævis*, has been found to be very valuable in the treatment of dysentery, and has been extensively used on the Gold Coast by Dr. Easmon for that disease and also as a hæmostatic. But the active principles of the plants of this natural order of plants appear to have received as yet little or no attention.

White Cedar Bark.

According to Dr. S. F. Landry, the brownish gum formed by evaporation of the juice of the common sow thistle (*Sonchus oleraceus*), when taken internally in a dose of two to four grains behaves as an "intensely powerful hydragogue cathartic," and acts powerfully upon the liver, duodenum and colon (*Med. Bull.*, July, p. 209). In its general effects it is said to most resemble elaterium, producing large and watery discharges, so that it has proved a valuable therapeutic agent in ascites and hydrothorax. It requires, however, great care in its administration, since it has the disadvantage of griping like senna and producing tenesmus like aloes. To counteract this, and to "correct its fierce attacks on the mucous membrane of the intestinal tract," Dr. Landry recommends that the gum should be administered in combination with manna, aniseed and carbonate of magnesia, or with stimulants and aromatics.

Sonchus oleraceus.

Professor Pariso, of Athens, records the discovery, by accident, of the tænicidal property of the cocoa nut, while he was resident in Abyssinia. On returning to Athens he made a number of observations, which, he says, were most satisfactory, the tæniæ being always passed and quite dead. He suggests that pharmacists might make cocoa nut preparations, which would be a great improvement on the nauseous oil of male fern (*Lancet*, August 18, p. 341).

Anthelmintic Properties of Cocoa Nut.

A short time since M. Arnaud described, under the name "oubain," a crystalline glucoside that he had separated from the wood of an apocynaceous plant, a species of *Carissa*, used as an arrow poison by the Somalis, to which compound he attributed the formula $C_{30}H_{46}O_{12}$ (*Pharm. Journ.*, April 28, p. 902). Since that time he has made an elementary analysis of crystalline "strophanthin" separated from the seeds of *Strophanthus hispidus*, and found it to have a composition answering to the formula $C_{31}H_{48}O_{12}$, from which it appeared that the two compounds are probably homologous (*Compt. Rend.*, July 16, p. 179). M. Gley has, therefore, been led to compare their physiological action, which proved to be practically identical in kind, though differing in degree (*Compt. Rend.*, July 30, p. 348). One of the most characteristic effects of these compounds when administered hypodermically is their action upon the heart, the motion of which they rapidly

Oubain and Strophanthin.

arrest in systole, even when administered in very minute doses, one-fortieth of a milligram of crystallized oubain being sufficient to effect this in a frog in six minutes. In respect to degree of toxicity oubain was found to be nearly twice as poisonous to frogs and rabbits as strophanthin, three times as poisonous to dogs and four times as poisonous to guinea-pigs. Introduced by way of the stomach both compounds were, of course, much less active.

Cod Liver Oil and other Fats.

The introduction under the name "lipanin" of a preparation consisting of olive or cotton-seed oil mixed with a little free fatty acid, as a substitute for cod liver oil, has led Herr Marpmann to question how far the presence of free acid in fats imparts to them the property of being readily assimilated which is characteristic of cod liver oil (*Apot. Zeit.*, July 28 and Aug. 1, pp. 516 and 528). A consideration of the facts that the amount of free acid present in different samples of cod liver oil is very variable, and that other fats—as, for instance, lard—frequently contain a larger proportion, but do not equal it in assimilative properties, and that there is no physiological ground for supposing that a neutral fat is not as readily acted upon as a fat containing free acid, led Herr Marpmann to doubt the utility of such an admixture and to test it experimentally. The experiments were based upon the assumption that a fat is best tolerated in the stomach when it is mixed well with other food and does not retard the action of the digestive juices upon it by coating the particles with an oily layer, thus delaying the passage of the whole to where it will come into contact with the pancreatic secretion. Different fats, in quantities of 5 grams, were mixed each with 100 c.c. of artificial gastric juice, heated to blood temperature and shaken. Cod liver oil gave a temporary mixture, upon the top of which a fatty layer formed after some minutes, but at the end of a quarter of an hour it still resembled an emulsion, and in twenty-four hours had only half cleared. Olive, rape, linseed, arachis, hemp, beech, poppy, and sesame oils all separated immediately after cessation of the shaking as an oily layer, which in twenty-four hours was sharply defined and pure. Castor oil also separated, but retained some appearance of emulsion. In each case, after twenty-four hours the supernatant oil was distinctly acid in reaction and glycerine could be detected in the watery liquid, so that the fat had been to a slight degree decomposed by the gastric juice. In another experiment a tea-spoonful of cod liver oil mixed more readily with the contents of a stomach than a tea-spoonful of cotton-seed oil. The former lost its greasy property, and was in a condition of minute division when it came into contact with the pancreatic secretion, whilst the latter arrived there in large drops. A third series of experiments was made with lipanin and a fat peptonate, together with sundry other mixtures more or less resembling them. Shaken with artificial gastric juice, in the proportion of 5 grams of oil to 100 c.c., lipanin mixed at first fairly well, but after a few minutes the oil separated nearly pure. Fat peptonate mixed, and no oil drops separated in twenty-four hours. Olive oil containing 5 per cent. of phosphoric acid behaved like pure olive oil. Olive oil with 5 per cent. of lanolin mixed, but after five minutes the greater part of the oil had separated. Olive oil with 0·5 per cent. of sodium oleate behaved nearly like cod liver oil. Olive oil with 1 per cent. of gum mucilage gave an immediate separation of the oil. Herr Marpmann concludes by saying that cod liver oil contains a substance, precipitable by alcohol or ether, which in aqueous solution is capable of imparting to other fats the properties of cod liver oil. Further that this substance occurs also in the pancreatic juice, and that it is precipitated by tannic acid and reduces copper solution.

Coagulation of Blood.

In a preliminary communication on the "Coagulation of Blood," recently read before the Royal Society (*Nature*, Aug. 2, p. 331), Mr. Halliburton gives some results of an investigation directed to determine the nature of the ferment that produces the change of fibrinogen into fibrin. It was found that lymph cells, obtained from lymphatic glands, yield as one of their disintegration products a peculiar globulin, which has been named "cell globulin," and has all the properties that have been hitherto ascribed to fibrin ferment. On the other hand, fibrin ferment as extracted from dried alcoholic precipitate of blood serum has been found on concentration to be a globulin with the properties of cell globulin, as also has the fibrin ferment extracted by saline solutions from washed blood-clot. The "serum globulin" prepared from hydrocele liquid differs from cell globulin in possessing no fibrinoplastic properties, and has therefore been named "plasma globulin," but a "serum globulin" prepared from serum has marked fibrinoplastic properties, due to the fact that, besides the inactive "plasma globulin," it contains "cell globulin" derived from the disintegration of white blood corpuscles, which are in origin lymph cells. It is therefore inferred that the coagulation of blood is caused primarily by the disintegration of the white blood corpuscles, which liberates cell globulin, and that this acts as a ferment, converting fibrinogen into fibrin, though it does not apparently become a constituent of the fibrin formed.

Physiological action of Malonic Acid.

At a meeting of the Physiological Society of Berlin, on July 20, Dr Heymans related the results of his experiments with malonic and methylsuccinic acid, the physiological action of which had not previously been investigated. He had been requested by Professor Henry, who had studied the chemical and physical properties of oxalic, malonic, succinic, and methylsuccinic acids, to investigate their relative toxic action. Dr. Heymans found that methylsuccinic acid was the least and oxalic acid the most poisonous of the series. One milligram of oxalic and 2 to 3 milligrams of malonic, 3 to 4 milligrams of succinic, and 7 to 8 milligrams of methylsuccinic acid were required to kill a frog (*Nature*, August 9, p. 360).

Artificial Colouring Substances.

The possibility that some of the numerous pigments now produced synthetically may be used for the purpose of colouring articles of food lends importance to any experiments that may be made as to their physiological action. Studies of the action of a few such compounds upon the animal organism have been made incidentally in the course of an investigation undertaken by Herr Weyl as to the relation between chemical constitution and physiological action (*Berichte*, xxi., 2191). Of the "nitroso" colouring compounds only the "naphtol-green B." was examined; and this

proved innocuous when administered to dogs in doses of one or two grams daily for a fortnight. Of the "nitro" compounds the dinitrocresol, or "saffron substitute," has already been reported as non-injurious. "Martius yellow," or dinitro-α-naphtol, which is well tolerated by rabbits, killed medium-sized dogs when small doses were given by the stomach. A dog weighing 6850 grams, to which a half gram dose was given on two successive days, and a gram of the more soluble sodium salt on the third, died on the fourth day. Less than a gram sufficed to cause the death of a similar dog when administered subcutaneously. It is noteworthy, however, that a sulpho acid of "Martius yellow," known as "naphtol yellow S.," proved innocuous to dogs even when administered in four times those quantities. Picric acid, a "nitro" compound, has been long known to be poisonous. Concerning "aurantias" (hexanitrodiphenylamine) there seems to be some conflict of statement, which possibly finds an explanation in the occurrence of two isomeric compounds in commerce, an "aurantia" from the Berlin aniline manufactory having been found non-poisonous to rabbits, whilst one from Basle is said to have proved very injurious to men. Among the "azo" colouring compounds none that is poisonous has yet been met with by Herr Weyl. On the other hand, three "saffranin" preparations were all of them found to exercise a toxic action.

Cholera Vaccination.

Considerable attention has been attracted during the past month to a communication presented to the Academy of Sciences by M. Pasteur on preventive vaccination against Asiatic cholera (*Compt. Rend.*, cvii., 432). According to the author, M. Gamaleia, the cholera vibrio discovered by Koch, an ordinary cultivation of which rarely communicates the disease to an animal inoculated with it, is greatly increased in virulence by passing through a guinea pig, so that it then will induce a fatal attack of cholera in a pigeon that would be unaffected by it in its original condition. The vibrio makes its appearance in the blood of the pigeon that succumbs, and after two or three such transits it acquires such virulence that one or two drops of blood containing it will kill a fresh pigeon of true cholera in eight to twelve hours. But if a pigeon be inoculated twice with an ordinary non-virulent cultivation of the cholera vibrio, it is said then to become refractory to cultivations of the most virulent form. Further, if a virulent virus be cultivated in a nutritive broth and afterwards heated to 120° C., so as to destroy all microbes, it will still contain a poisonous substance derived from the microbes, which in sufficient, but still minute quantities, produces progressive lowering of the temperature and eventually death. But in fractional inoculations of less than poisonous doses, this substance is said to be capable of establishing an immunity from cholera. In fact, M. Gamaleia claims that in this way he can obtain a chemical or non-organized vaccine capable of rendering human beings resistent to cholera, and he expresses his willingness to have its efficacy tested upon his own person, or to test it upon others in any place where cholera may be raging. Some remarks made by M. Pasteur seemed to indicate that in respect to immunity from hydrophobia he is inclined to trust to the inoculations of the sterilized secretions of the microbes rather than to those containing living organisms.

Phlogosin.

The view that the secretions of micro-organisms are frequently the direct factors in the causation of disease, rather than the organisms themselves, seems to be gaining ground. Herr Leber having found sterilized *Staphylococcus* cultivation to be still capable of inducing the condition of suppuration sought for the active principle, which he reports he has isolated, and named "phlogosin." It is described as being easily soluble in alcohol and in ether, but soluble with difficulty in cold water, and as separating from its solutions in fine crystalline needles. With potassiomercuric chloride and potassiocadmium iodide it gives a yellow precipitate and with potassiobismuth iodide it gives a brown one (*Apot.-Zeit.*, Aug. 25, p. 622).

Poisoning by Aconite and Belladonna.

A singular case of recovery from taking a mixture of aconite and belladonna liniment is recorded in the *Lancet* (Aug. 18, p. 313). The patient was an old lady, 75 years of age, who swallowed, by mistake, a large tablespoonful of a mixture of equal parts of the two liniments. After the ordinary treatment in evacuating the stomach, the patient being almost moribund, hypodermic injections of ten minims of brandy were made at intervals of about 15 or 20 minutes. The brandy in this case proved to be a veritable *eau de vie*, since it enabled the patient to recover, although the previous administration by mouth of two drachm doses of the same stimulant had failed.

Adulterated Vanillin.

According to the *Deutsch-Amerikanische Apotheker-Zeitung* (July 1, p. 103) vanillin is frequently adulterated in the United States with benzoic acid, one sample examined having been nothing more than that acid perfumed with vanillin. Upon treating such a mixture with dilute solution of sodium carbonate the benzoic acid goes into solution, and the benzoic acid can be thrown out of solution again by adding excess of water, or the filtrate, after neutralization with hydrochloric acid, will give with ferric chloride a red-brown precipitate of ferric benzoate. The acid or the benzoate can be reduced by means of sulphuric acid and magnesium ribbon to benzaldehyd, which is recognizable by its characteristic odour of bitter almonds.

Eucalyptol and Eucalyptus Oils.

The question as to whether eucalyptol occurs in the essential oil of *Eucalyptus amygdalina* as well as in that of *E. Globulus* has been answered with equal positiveness in the affirmative and in the negative, and only a few months since (see *Pharm. Journ.*, [3], xviii. 343) Messrs. Schimmel reiterated a denial somewhat circumstantially. The disputed point has been investigated in Professor Wallach's laboratory by Herr Gildemeister (*Pharm. Zeit.*, Aug. 22, p. 499), who found that the principal constituent of *E. amygdalina* oil is phellandren, which it will be remembered has been recognized by Professor Wallach as occurring also in elemi and the water fennel (*Pharm. Journ.*, July 28, p. 61). He has also found that the formation of a hydrobromic acid compound of eucalyptol is a much more delicate test for its presence than that of the hydrochloric acid compound as hitherto used, and in this way he has ascertained that in the *E. amygdalina* oil, besides phellandren, eucalyptol is present in considerable quantity. In addition, previous statements that eucalyptol is identical with cineol and with cajuputol have been further con-

firmed by the formation of cineolic acid as an oxidation product from all three. It has also been ascertained that cineol (=eucalyptol) is formed, among other products, when terpin hydrate is boiled with dilute sulphuric or phosphoric acid.

Spongine. Spongine, the organic matter of sponges, has been studied from the point of view of its chemical constitution by M. Zalocostas (*Compt. Rend.*, July 23, p. 252). Sponge, after being washed with dilute hydrochloric acid and benzene, was submitted to the action of barium hydrate under pressure. The products of the decomposition were free ammonia, carbonic anhydride, oxalic acid, acetic acid, and a mixture of fixed nitrogenous principles. The ammoniacal nitrogen (4·20 per cent.) was about equal to one-fourth of the total nitrogen (16·40 per cent.), as in the case of albumen, and for each molecule of carbonic anhydride and oxalic acid were found two atoms of ammoniacal nitrogen, as in all proteid matters. The decomposition is represented as follows:—

$$\underset{\text{Spongine.}}{C_{40}H_{64}N_{12}O_{17}} + 12\,H_2O =$$

$$3NH_3 + CO_2 + \underset{\text{Oxalic Acid.}}{\tfrac{1}{2}C_2H_2O_4} + \underset{\text{Acetic Acid.}}{\tfrac{1}{2}C_2H_4O_2} + \underset{\text{Fixed Residue.}}{C_{37}H_{76}N_9O_{24}}.$$

It is pointed out that the number of molecules of fixed water is equal to the number of atoms of nitrogen, and that in the fixed residue the relation between the atoms of carbon and hydrogen is as 1 : 2; and the relation between the nitrogen and oxygen 1 : 2·66, the ordinary relation in albuminoids and collagenous substances being as 1 : 2. Analysis of the mixed fixed residue showed that it contained leucine, butalanine, tyrosine, glycalanine, and hydrate of leucine. It would appear therefore that spongine approximates to proteid matter in its constitution and especially to collagenous matter.

Chlorine and Cyanogen. The difficulty of reconciling the isomorphism of potassium chloride and potassium cyanide with the elementary character of chlorine has led Dr. Allary to assume that chlorine is composed of two constituents, the atomic weights of which may stand in the same relation to each other as those of the elements of cyanogen (C=12 and N=14). If the sum of 35·5, representing the weight of chlorine, be divided into two parts bearing this relation to each other the result is 19·1 and 16·4, and Dr. Allary thinks that this points to the probability of chlorine being composed of fluorine (19), and oxygen (16), possibly intimately combined by means of half an atom of hydrogen (0·5) (*Pharm. Centralh.*, Aug. 9, p. 393). It may be mentioned that Dumas has represented the atomic weight of chlorine by the compound symbol 19+16·5.

Supposed Deoxidation by Cold. M. Languepin records the observation (*Nouv. Rém.*, Aug. 8, p. 343) that a 30 per cent. solution of ferrous sulphate, which after exposure had become converted into ferric sulphate, so that the sides of the bottle were covered with an ochreous layer, when frozen during cold weather formed a block of greenish-white ice, which upon melting yielded a liquid having the characteristic green colour of a solution of the ferrous salt. In like manner another solution of the same strength, but containing 1 per cent. of tartaric acid, which was yellow although it had not undergone so much change, resumed its original colour under the influence of congelation. It was also observed that these solutions, after being thus frozen and again liquefied, remained unaltered for an unusually long time. These results are attributed by M. Languepin to a deoxidizing effect produced by the low temperature to which the liquids were subjected in freezing. But the question arises whether, in accordance with what is known to occur in congelation, the insoluble ferric compound was not excluded from the ice, so that upon melting the ice yielded an unusually pure solution of ferrous sulphate, though correspondingly weaker than the original one.

Cross-fertilization of Plants. At the present time there is in flower at the Botanic Garden, at Edinburgh, an interesting hybrid of the genus *Hedychium*, which has been, according to Mr. R. Lindsay, the able Curator of the garden, twice modified by cross-fertilization. Originally a white flowered species, with a very sweet perfume, it had the disadvantage of opening only one or two flowers at a time. It was then fertilized with a yellow-flowered species which opens several flowers at once, in the hope of communicating this property to the former. The result was successful, only the flowers assumed a dull yellowish tint. This plant was again crossed with the white-flowered species, with the result of obtaining the desired end, viz., several white flowers in blossom at one time.

Hordeum distichon, etc. In a paper read before the Royal Academy of Sciences, of Amsterdam, by Mr. Beyerinck, the author gave an interesting account of his attempts to hybridize the various sorts of barley in cultivation. He finds that *H. vulgare*, *H. hexastichon*, *H. distichon*, *H. zeocriton*, and *H. trifurcatum* may be crossed with facility, the hybrids being perfectly self-fertile, those produced from *H. vulgare* f. and *H. distichon* m. and those from *H. vulgare* f. and *H. zeocriton* having even cleistogamous flowers. The third generation of a cross between *H. vulgare* f. and *H. zeocriton* m. produced *H. hexastichon*, and a cross effected in 1804 between *H. distichon* f. and *H. trifurcatum* m. yielded this summer a form almost completely without awns (*Nature*, August 2, p. 336).

Cultivation of Lichens. A very interesting paper has been contributed by Mr. Alfred Moeller to the transactions of the Botanic Institute of the Royal Academy at Münster. In this he demonstrates that if the spermatia of lichens are placed in a suitable nourishing medium they can be made to germinate, and that they are consequently spores and do not correspond to male organs or antheridia. The spermatia of lichens must consequently in future be regarded rather as analogous to conidia and as being the asexual form of reproduction of the plant. Carrying his experiments still further, the author found that by continuing the cultivation, whether from spores or spermatia, in the nutritive medium, a well developed thallus could be obtained, he having succeeded in obtaining such of *Lecanora subfusca*, *Thelotrema lepadinum*, *Pertusaria communis*, *Lecidella enteroleuca*, *Opegrapha subsiderella*, *Graphis scripta*, *Arthonia vulgaris*, *Verrucara muralis*, *Calicium trachelinum*. In one species, *Calicium parietinum*, he obtained also asci and spermatia (*Bull. Soc. Bot.*, p. 78). If these experiments are confirmed by

other observers, it follows that lichens are simply a group of ascomycetous fungi, whose mycelium assumes a definite or thalloid form, and which feed on living algæ just as *Æcidia*, *Puccinia*, etc., feed on living plants.

Fruit of Archidendron.

The valuable work of Baron von Mueller, which is now being issued in decades, contains an illustration of a curious Leguminous plant, *Archidendron*, in which the fruit, unlike nearly all the rest of the family, is apocarpous, consisting of as many as fifteen fruitlets to a single flower (*Gard. Chron.*, July 28, p. 103). Although these exceptions are very puzzling to the beginner in botany, they are rare in the families in which they occur, but they are worth noting when met with.

Botany of Socotra.

A detailed account of the botany of the island of Socotra, by Professor I. B. Balfour, has at length been published by the Royal Society of Edinburgh. This, like Dr. Aitchison's recent paper in the 'Transactions the Linnean Society,' contains references to several plants of interest to pharmacists as well as botanists. Of these, the Socotran dragon's blood, *Dracœna Cinnabari*, frankincense, and myrrh trees, and the *Aloe Perryi* may be noticed. A curious pomegranate, remarkable as being the wild representative of the common pomegranate and for having only one row of carpels, is described under the name of *Punica protopunica*. Two other plants, specially noteworthy from a botanical point of view, are a tree belonging to the *Cucurbitaceæ*, *Dendrosicyos Socotrana*, and an erect shrub belonging to the genus *Cocculus* (*C. Balfourii*).

THE ACTION OF LIGHT ON WATER COLOURS.

BY DR. W. J. RUSSELL, F.R.S., AND CAPTAIN ABNEY, F.R.S.

(*Concluded from page* 148.)

Description and Result of Experiments with Various Colours.—In the following experiments the moist colours of one firm were employed, action of light being tried on the single colours, and on mixtures of two or more colours. Those mixtures were avoided in which a change would of necessity take place without the action of light owing to the known chemical composition of the colours.

The paper used was Whatman's, and in order that no variation of quality should occur in different experiments, sufficient was obtained at once for the whole investigation. This paper was examined and found to contain only a trace of thiosulphate and in every square foot nearly 1 grain of sizing matter. The amount of moisture present is a matter of considerable importance, and obviously will vary with the condition of the surrounding atmosphere. It was found that the "hot pressed" paper is capable of absorbing from a moist atmosphere as much as 12·46 per cent. of its weight of water, the "not pressed" 12·20, and the rough 12·07 per cent. This absorption of moisture goes on slowly, even when the paper is fully exposed to a saturated air. Twenty-four hours elapse before the paper is perfectly saturated.

The investigation was commenced by taking a very large number of the colours ordinarily used and exposing them to conditions rigorously determined. The colours to be tested were applied, by a practised hand, to the paper in a series of washes, the first wash extending over the whole sheet, the second one leaving a strip 1 inch wide and the length of the paper untouched. In most cases as many as eight washes were applied, giving thus a complete series of eight tints. In the following experiments strips 2 inches wide and 8 inches long, having all the tints upon them, were used.

In the first series of experiments the colours were subjected to conditions similar to those to which pictures are subjected, but to an exaggerated extent. Two strips of the coloured paper cut from the same sheet were carefully introduced into a glass tube ¾ inch in diameter and 2 feet long, open at both ends, the upper end being bent over to prevent the entrance of wet and dirt. The tubes were hung vertically out of doors against a wall facing nearly south, where all the sunshine until after 3.30 could fall upon them. A piece of American cloth was carefully bound round one half of the tube, thus effectually protecting one strip of the paper from light. The two pieces of identically tinted coloured paper were therefore under exactly the same conditions in all respects, except that one was exposed to light and the other was in the dark.

In these experiments the colours were exposed to the action of light, air, and moisture, as are pictures, only to a greater extent. They had to bear the action of direct sunlight, the air circulated through the tube, and the paper was in contact with the outer air. This free circulation of the air also prevented, as already indicated, any very appreciable rise in temperature in the tube. These papers were exposed from May, 1886, till March, 1888. They were observed for the first time on August 14, 1886, again in December, 1886, and in July and in November, 1887, and finally in March, 1888.

In some cases the colour entirely disappeared, in carmine, for instance. In the majority of cases only a part of the colour disappeared, the thinner washes fading out, but the following pigments remained unchanged:—Indian red, Venetian red, burnt sienna, chrome yellow, lemon yellow, raw sienna, terra verte, chromium oxide, Prussian blue, cobalt blue, French blue and ultramarine ash. The following mixtures also underwent no change:—Raw sienna and Venetian red, raw sienna and Antwerp blue, cobalt and Indian red. The following table shows approximately the order of instability of the single colours in open tubes which we have tried, beginning with the most fugitive:—

Carmine.	Permanent blue.	
Crimson lake.	Antwerp blue.	
Purple madder.	Madder lake.	
Scarlet lake.	Vermilion.	
Paynes grey.	Emerald green.	
Naples yellow.	Burnt umber.	
Olive green.		
Indigo.	Yellow ochre.	Show no change.
Brown madder.	Indian red.	
Gamboge.	Venetian red.	
Vandyke brown.	Burnt sienna.	
Brown pink.	Chrome yellow.	
Indian yellow.	Lemon yellow.	
Cadmium yellow.	Raw sienna.	
Leitch's blue.	Terra verte.	
Violet carmine.	Chromium oxide.	
Purple carmine.	Prussian blue.	
Sepia.	Cobalt.	
Aureolin.	French blue.	
Rose Madder.	Ultramarine ash.	

Of these thirty-nine single colours twelve were not acted upon at all by light, and two others were only after this long exposure to direct sunlight very slightly faded.

All of these, except Prussian blue, are purely mineral colours. Of the thirty-four mixtures tried only three remained from first to last unchanged, but six mixtures containing Prussian blue, although at first unaltered, on placing in the dark for six weeks more or less returned to their original colour.

It is of considerable interest to note that in the cases in which any change occurred it had commenced before December, 1886, though not in all cases before August 14.

In another series of experiments, carried out at the same time with mostly the same pigments, the atmos-

phere to which they were exposed was free from all moisture. The glass tube was first heated, allowed sufficiently to cool, the dried tinted paper carefully introduced, and the glass tube hermetically sealed. As before, two similarly-coloured strips of paper were introduced into each tube, one was protected from light, the other exposed fully to it. Thirty-eight experiments were made with single colours; but under this altered condition, twenty-two instead of twelve were found to be permanent, principally those colours which in the former experiments were only very slightly faded. In two cases the colour in the open tube was not acted on, while that in the dry tube was; these cases are brown madder and Prussian blue. The colours which were unchanged in dry air, but were acted on in ordinary air are madder lake, cadmium yellow, Naples yellow, emerald green, olive green, Payne's grey, sepia and burnt umber. Again, with the single exception of madder lake, all the above which were not acted on in dry air are mineral colours.

In the next series of experiments the colours were exposed to air fully saturated with moisture. The paper was saturated with moisture, and was sealed up in tubes containing moist air. Thirty-seven experiments with single colours were made. Only 10 colours withstood the action of light under this condition: these were Indian red, Venetian red, burnt sienna, yellow ochre, raw sienna, emerald green, terra verte, chromium oxide, cobalt, and ultramarine ash. No vegetable colour is in this list, and both Prussian blue and Antwerp blue were entirely destroyed. Twenty-nine mixtures were also tested in a similar way, and only two remained unchanged; these were raw sienna and Venetian red, and cobalt and Indian red.

To eliminate the effect of oxygen, a further series of experiments were made in which the colour was exposed in an atmosphere of moist hydrogen gas. Thirty-six experiments were made with single colours, and of these no less than 22 remained unchanged; even carmine and crimson lake did not alter, neither did madder lake, Indian red, Venetian red, brown madder, burnt sienna, chrome yellow, yellow ochre, raw sienna, terra verte, chromium oxide, olive green, indigo, cobalt, French blue, ultramarine ash, permanent blue, Payne's grey, sepia, Vandyke brown, and burnt umber.

In another series of experiments the air and moisture were, as far as possible, removed from the tubes containing the coloured papers; the papers were carefully dried, and the air pumped by a Sprengel pump out of the tube, which was then hermetically sealed. Thirty-nine experiments with single colours were made, and hardly any colour under this condition was acted on by light. Violet carmine and purple carmine slightly darkened; Prussian blue and purple madder and sepia slightly bleached; but in all cases the action was very feeble. Twenty-four experiments were made with mixed colours, and the results are of much interest and importance. The mixtures containing Prussian blue changed, the other colour becoming dominant. Vermilion also blackened. With other mixtures hardly any change occurred.

To determine whether a mixture of ox gall would influence the results, several colours were mixed with that substance and tested in the same way and under the same conditions as the colours above had been tested. In no case was it found that the addition of the ox gall altered the result.

In selecting the colours to be exposed to the electric light we have chiefly taken those most easily acted on. These were exposed, some in a frame with a glass in front; others under the most favourable conditions for fading, viz., in sealed tube with moist air to the full action of the electric light for about 84 hours. The light falling on these colours is estimated as having an illuminating value of 2000 candles at a foot off.

Under these conditions the only single colours in the frame which underwent change were crimson lake (bleached and more red), and carmine (bleached and more red). Antwerp blue, Prussian blue, Naples yellow, brown pink, purple madder, rose madder, Vandyke brown, sepia, vermilion, Venetian red, Indian yellow, gamboge, indigo, Leitch's blue underwent no change. With mixtures, Prussian blue, yellow ochre and Vandyke brown, Prussian blue and raw and burnt sienna, and Prussian blue and burnt sienna all became slightly browner. Indigo and burnt sienna, indigo and gamboge, indigo and Indian red, Prussian blue and gamboge, Prussian blue and purple carmine, Prussian blue and Vandyke brown, Prussian blue and Indian red, Antwerp blue and raw sienna, rose madder and raw sienna, chrome yellow and vermilion, Venetian red and raw sienna underwent no change. In the tubes with moist air carmine and Naples yellow very slightly altered, and crimson lake altered more. The following colours underwent no change: rose madder, vermilion, madder lake, gamboge, Indian yellow, Prussian blue, Antwerp blue, indigo, Leitch's blue, Vandyke brown, brown pink sepia; neither did the mixtures of Prussian blue and Indian red, Prussian blue and gamboge, indigo and burnt sienna, indigo and Indian red. From the nature of these experiments they could not be carried on for an indefinite length of time.

To determine whether heat, without light, would have any effect, the strips of the following colours, cut from the same sheets as those used in the previous experiments, were sealed up with moist air in glass tubes and heated for seven hours a day for three weeks in boiling water, all light being excluded.

Indian yellow changed very decidedly, a mixture of Prussian blue and gamboge went brown, also a mixture of Prussian blue and burnt sienna and Prussian blue and raw sienna, Antwerp blue, Leitch's blue and permanent blue all bleached. In a second experiment the permanent blue did not change. Indigo and Venetian red also bleached very slightly and became more red in colour, whereas carmine, crimson lake, vermilion, Venetian red, Prussian blue, indigo, sepia, and brown pink underwent no change. Two tubes with rose madder were used, one of them bleached very slightly, the other not at all.

An ordinary gas jet, burning 2 cubic feet per hour, was kept burning day and night for three weeks in a cupboard 6 feet 6 inches long, 2 feet 6 inches wide, 5 feet 6 inches high. At the top of the cupboard was fastened a board on which strips of the following colours were pinned:—Indian red, madder red, rose madder, carmine, crimson lake, Venetian red, scarlet lake, madder lake, vermilion, burnt sienna, Indian yellow, burnt umber, gamboge, Naples yellow, chrome yellow, cadmium yellow, aureolin, chromium oxide, emerald green, Prussian blue, cobalt, indigo, Payne's grey, Leitch's blue, Antwerp blue, French blue, purple carmine, sepia, indigo and gamboge, indigo and Venetian red and yellow ochre; Prussian blue and raw sienna, Prussian blue and Venetian red, Prussian blue and crimson lake. The temperature to which these colours were exposed was 82° F. Of course no moisture deposited upon them, but the window to the cupboard was bedewed; under these circumstances hardly any change occurred. Crimson lake was slightly bleached, madder lake became a little redder, and Antwerp blue and Prussian blue a shade greener.

Mixtures of rose madder and Indian yellow, and of Prussian blue and gamboge, when mixed with Chinese white faded more rapidly than without it, and a mixture of Prussian blue and crimson lake are strikingly acted on, for without Chinese white the mixture becomes blue, but if mixed with Chinese white, it becomes of a bright pink colour. The fading of Prussian blue appears to be brought about by the addition of Chinese white. The following mixtures exposed in a frame at a window receiving about half the day's sun from May 19, 1887, till January 18, 1888, did not show

any marked difference although mixed with Chinese white:—Indigo and burnt sienna, vermilion and chrome yellow, Antwerp blue and burnt sienna, purple madder and burnt sienna, rose madder and Indian yellow. The following single pigments were also tried, but the addition of Chinese white did not appear to hasten their fading. The vermilion mixed with the Chinese white darkened a shade more than without it, and the fading of Prussian blue was increased by it:—

Carmine.	Brown pink.
Rose madder.	Purple madder.
Crimson lake.	Violet carmine.
Vermilion.	Paynes grey.
Gamboge.	Antwerp blue.
Indian yellow.	Prussian blue.
Vandyke brown.	Indigo.
Sepia.	Burnt sienna.

Strips of rose madder, Payne's grey, sepia, vermilion, violet, carmine, crimson lake and Prussian blue, indigo and burnt sienna, and Prussian blue and burnt sienna, with and without Chinese white, were sealed up in tubes with moist air and exposed to all the sunlight there was from May 20 till July 29, 1887. The only case in which the addition of the Chinese white made a perceptible difference was in the mixture of Prussian blue and crimson lake.

Certain single and mixed colours, chosen on account of their instability, were exposed from May, 1887, till January, 1888, under such conditions as to receive about one-half the skylight and half the possible amount of sunlight. Taking first the action of the red light, only four single colours were acted upon but slightly by it, these were indigo, Leitch's blue, crimson lake and Prussian blue. With the mixed colours, the only cases in which action occurred were those in which indigo was present, which faded, for the indigo was destroyed. Under the green glass five single colours and two mixtures showed alteration, viz., Leitch's blue, Payne's grey, crimson lake, Vandyke brown, carmine, Prussian blue and crimson lake, also Prussian blue with raw sienna. All these changes occurring under the red and green glasses were very slight. These particular colours absorb in the red and in the green, hence their fading. With blue glass the amount of fading was nearly, though not quite so much, as under the white glass, the difference being due to the opacity of blue glass even for blue rays. All the colours under the blue and white glass (burnt sienna excepted) were acted on. This clearly shows that it is the blue end of the spectrum which is active in producing the fading of colours.

In order to have similar specimens of colours subjected to milder treatment, and under conditions approximating to those to which pictures are usually subjected, strips of tinted papers were exposed in a picture frame under a glass, so that one-half of each paper was exposed to light, and the other half, bent back, was entirely shielded from the light. The back and glass were carefully pasted into the frame so as to exclude dust, as would be done with a picture, and the frame was then exposed in a room to a very bright light, but not to direct sunlight. During a part of the time the frame was hung up against a window, during the remaining time it was at a little distance from the window. The frame was first exposed to the light on August 4, 1886, and was opened, and the colours examined, on May 6, 1888.

Of the single colours it was found that the gamboge, indigo, and Naples yellow had slightly faded. Brown pink had faded perceptibly to 6. Carmine had bleached to 3; Vandyke brown had faded to 1, and was fainter to 4; and crimson lake had faded to 5, and all the darker shades had become paler. With mixtures, Prussian blue and burnt sienna had changed, the blue had faded; with Prussian blue and Vandyke brown, and with indigo and Vandyke brown in both cases the Vandyke brown had faded; with Prussian blue and, gamboge, the gamboge had slightly gone in 1; with indigo and burnt sienna the indigo had gone in 1, and all the shades had become browner, indigo and gamboge had become paler throughout, both colours apparently fading; with indigo and Indian red, the indigo had gone completely in 1, and in part in all the tints. The other colours, both single and mixed, had not changed.

The reporters summarize as follows the conclusions which are to be drawn from the results of the experiments described in this first report.

Mineral colours are far more stable than vegetable colours, and amongst those colours which have remained unaltered, or have only very slightly changed after an exposure to light of extreme severity, a good gamut is available to the water colour artist.

The presence of moisture and oxygen are in most cases essential for a change to be effected, even in the vegetable colours. The exclusion of moisture and of oxygen, particularly when the latter is in its active condition, as experiments to be described in our next report show, would give a much longer life, even to these, than they enjoy when freely exposed to the atmosphere of a room. It may be said that every pigment is permanent when exposed to light *in vacuo*, and this indicates the direction in which experiments should be made for the preservation of water colour drawings.

The effect of light on a mixture of colours which have no direct chemical action on one another is that the unstable colour disappears and leaves the stable colour unaltered appreciably.

The experiments also show that the rays which produce by far the greatest change in a pigment are the blue and violet components of white light, and that these, for equal illumination, predominate in light from the sky, whilst they are less in sunlight and in diffused cloud light, and are present in comparatively small proportion in the artificial lights usually employed in lighting a room or gallery.

The experiments have also shown that about a century of exposure would have to be given to water colour drawings in galleries lighted as are those at South Kensington before any very marked deterioration would be visible in them, if painted with any but the more fugitive colours; and that when the illumination is of the same quality as that of gaslight, or of the electric glow light rendered normally incandescent, and of the same intensity as that employed in those galleries, an exposure to be reckoned by thousands of years would have to be given to produce the same results. This does not take into account the action, if any, which might arise from the products of combustion where gaslight is the illuminant, and which the experiments so far have shown to have but a trifling effect, nor of any modification of hue which might be due to change in the whiteness of the paper on which the paintings were made, but simply to the change in the colours themselves. When it is determined what is the minimum illumination in which a water colour drawing can be well seen, the length of time during which the drawing will retain almost its pristine freshness can be easily calculated.

Since it is the blue light which causes the fading, it might be thought that the glazing of skylights with a glass of a slightly yellow tint should be adopted. It must be recollected, however, that in ordinary diffused sunlight this would entail an alteration in the brilliancy of the blues of a picture, and a change in their tone. It is well known to artists that a picture painted or illuminated by blue skylight looks colder than one illuminated by diffused sunlight, whether the diffusion be caused by white blinds to the gallery or by cloud. When the illumination is from the blue sky a yellow glaze or blind might be useful in imparting the warmer tone of diffused sunlight, and at the same time it would reduce in intensity the destructive component of the light.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 1, 1888.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

ALKALI MANUFACTURE.

THE annual report of the Chief Inspector of Alkali Works always contains matter of sufficient interest for reference to it in these pages, but this year we have hitherto been unable to devote space to this purpose, though the report for the past year is by no means less deserving of notice than it has been on other occasions. In addition to the more special portion of the report, detailing the work done by the Inspectors under the Acts in force for regulating alkali works throughout the kingdom, one section of the report is devoted to a review of the conditions under which the struggle between the old LEBLANC method of making soda and that known as the ammonia process is being carried on. This is a matter affecting a most important national industry, and therefore must be one of interest from that point of view no less than from its connection with the supply of a material largely employed by the pharmacist. Up to within the last few years the process of soda manufacture was that invented by the French chemist, LEBLANC, as a means of providing France with alkali in place of that which had hitherto been derived from abroad after the supply had been interrupted during the war between France and England. This process was subsequently adopted in England, and it had become the exclusive source of soda. The ammonia process dates back, so far as a knowledge of its principles is concerned, to a period considerably more remote than that of its adoption as a means of manufacture, but since this has been effected it has become a serious rival of the old LEBLANC method. The competition is now continued very keenly, though the result remains still uncertain, and the progress made is watched with anxious interest by chemists, as well as by those who are commercially concerned. The amount of capital invested in the older process of LEBLANC is believed to amount to no less a sum than three millions sterling, and nothing can more strikingly illustrate the importance of the competition now being carried on between it and the ammonia process than the consideration that this enormous capital would be to a great extent sacrificed if the success of the newer method of making soda were so far established as to make the older process unprofitable. There are, however, some essential differences between these two methods of making soda which are important from the fact that they exercise a great influence upon the competition. Thus, for instance, the production of chlorine, which is a necessary feature of the LEBLANC method, has not yet been combined with the ammonia process. Carbonate of soda is the only product of the latter, and, consequently, whilst the price of that article has been reduced by the new supply made by the ammonia process it has been possible to advance the price of chlorine products resulting from the LEBLANC process. This result has so far afforded a means of existence for the manufacturers who make soda by the LEBLANC method. It is interesting to observe that this condition which conserves the existence of soda makers who use the older process is precisely the one by which the Alkali Act was called into existence, its primary object having been to compel the manufacturers to condense and save the hydrochloric acid, which being formerly looked upon as a waste product was allowed to escape and pass up the factory chimnies, causing great damage to vegetation and operating detrimentally otherwise. The competition caused by the working of the ammonia process has entirely altered the state of things in this respect, and, as pointed out in the report referred to, it is now almost the chief object of the manufacturer working the LEBLANC process to produce hydrochloric acid. He actually loses money on all the soda he sells, but makes his profit on the chlorine products, and is therefore induced to increase their yield to the utmost.

This condition of affairs is, however, one that might be totally upset if the manufacturers using the ammonia process were to succeed in devising a method for utilizing their waste chlorine, which is now thrown away in the form of calcium chloride. In that they have material for the production of bleaching powder and chlorate of potash, but the method of turning it to account for that purpose has not yet been worked out. Whenever that is accomplished it is most probable that if the work be done as cheaply as is the case now under the LEBLANC method the long reign of the latter must come to an end, and all the works where it is carried on must be discontinued. But so long as this disparity in favour of the LEBLANC method holds good, and if the LEBLANC makers can produce more available chlorine from the salt employed, or utilize any other of the materials now wasted, so far will their position in the existing competition be strengthened. To give some idea of the intensity of this struggle between the two modes of manufacture, it may be stated that in the years 1885 to 1887 the quantity of salt decomposed in the LEBLANC process was about 584,000 tons, with a small decrease each year,

while the quantity decomposed in the ammonia process increased from 115,032 tons to 158,636 tons. These figures also give an idea of the magnitude of the manufacture as well as of the rapid advance that has been made by the new process.

Another circumstance bearing upon the future of the alkali manufacture is the working of what is termed alkali waste, which has hitherto been to a great extent a source of nuisance. A most interesting process has lately been introduced by Messrs. CHANCE BROTHERS for saving the whole of the sulphur contained in this waste material. The quantity of it that is now produced annually is no less than 1,500,000 tons, and there are vast accumulations of it that have resulted from the working of many years. At Widnes, in Lancashire, these deposits cover an area of 450 acres and contain about eight million tons of the material. This is added to day by day to the extent of a thousand tons daily. The amount of sulphur in this material is about 15 per cent., and with a practicable means of recovery it would constitute a sulphur mine at the very seat of the works where that material is required. On this account, Messrs. CHANCE'S method of utilization promises to be a most important improvement for the alkali manufacture, as well as a great benefit as regards the sanitary condition of the localities where alkali works are situated. Another process now actively carried out at Widnes for the same purpose, is that introduced by Messrs. PARNELL and SIMPSON. This is a combination of the ammonia process with that of LEBLANC. It is already at work on a large scale, but sufficient time has not elapsed for the commercial results to be known. It may, however, be anticipated that by one or other of these processes the production of alkali waste, as a source of nuisance and inconvenience, will soon be done away with.

In addition to the illustrations above afforded of the benefit arising from the application of scientific knowledge in manufactures, another is presented by the production of ammonia salts. The principal source of them is gas liquor, which was formerly got rid of by any means and with difficulty, but is now advantageously worked and gives a yearly supply of more than a hundred thousand tons of sulphate of ammonia, having a market value of about a million and a quarter sterling. A further large production of ammonia salts is now carried out at the shale distilling works and at iron works, as well as in the manufacture of coke. This is effected by washing the gaseous products given off and condensing the ammonia contained in them. The introduction of new methods of carbonizing and treating fuel may also be expected to have the result of increasing still more the supply of ammonia from such sources. These improvements may to some extent be ascribed to the operation of the Alkali Act, and it is satisfactory to learn that manufacturers who at first dreaded inspection under that Act as an unwelcome intrusion now acknowledge that it has been an aid in the management of their works and a benefit rather than the reverse.

PRESENTATION OF AN ADDRESS TO PROFESSOR BENTLEY.

THE prolonged and valuable services rendered by Professor BENTLEY to the Royal Botanic Society of London have recently been the subject of a well-deserved recognition in the shape of a beautifully illuminated address presented to him on behalf of the Council of that Society. The text of the address was as follows :—

"Royal Botanic Society of London,
"Gardens, Regent's Park.
"To Professor ROBERT BENTLEY.

"Sir,—At a meeting of Council this day, I was requested to convey to you, which I do with sincere pleasure, the cordial thanks of the Council and Fellows of the Royal Botanic Society of London for your able assistance in its objects by the Botanical Lectures you have during the past 35 years delivered in the Society's Gardens.

"Permit me at the same time to express our fervent hope that on retiring from your more active labours you may for many years enjoy the prospect of the valuable results of your prolonged and laborious work.

"FRANCIS, Duke of Teck, *President*."

THE BRITISH PHARMACEUTICAL CONFERENCE.

IN addition to the list of titles already published of papers intended to be read at the Conference which commences in Bath on Tuesday next the Honorary Secretaries have received the following :—

11. Report on the Cultivation of *Aconitum Napellus*. By E. M. HOLMES, F.L.S.
12. On the Solubility of Citrate of Caffeine. By A. W. GERRARD, F.C.S.
13. Extraction by Pressure. By C. SYMES, Ph.D.
14. Pharmacy as a Profession. By A. P. BALKWILL.
15. Note on Insect Powder. By W. KIRKBY, F.R.M.S.
16. On Digitalis. By Dr. J. C. THRESH.
17. Citrate of Caffeine. By J. MOSS, F.I.C., F.C.S.
18. English Oil of Peppermint and Distilled Oil of *Mentha Arvensis* (Japan Peppermint). By J. MOSS, F.I.C., F.C.S.

We understand that under the permission lately given to use tea for the manufacture of caffeine without payment of duty the production of this alkaloid has already been commenced, and we have just received from Mr. Christy a fine sample of the product, bearing the label of Messrs. Howards, of Stratford, and two others from Mr. Whiffen, of Battersea, who is also manufacturing caffeine. Mr. Christy has been mainly instrumental in obtaining the concession by which it has become possible to manufacture caffeine in this country. Hitherto the supply has been obtained chiefly from Germany; but, of course, the necessity of paying duty upon tea used for that purpose was the only reason why caffeine was not made in this country before, since the duty on tea amounts to as much as the value of the alkaloid it contains.

British Medical Association.

THE GASEOUS CONSTITUENTS OF THE BLOOD IN RELATION TO RESPIRATION.*

BY JOHN GRAY MCKENDRICK, M.D., LL.D., F.R.SS.L., AND E., F.R.C.P.E.,

Professor of the Institutes of Medicine in the University of Glasgow.

(*Concluded from page* 159.)

The method followed by Magnus will now be understood. By allowing the blood to flow into an exhausted receiver surrounded by hot water, gases were set free. These were found to be oxygen, carbonic acid, and nitrogen. He further made the important observation that both arterial and venous blood contained the gases, the difference being that in arterial blood there was more oxygen and less carbonic acid than in venous blood. Magnus concluded that the gases were simply dissolved in the blood, and that respiration was a simple process of diffusion, carbonic acid passing out and oxygen passing in, according to the law of pressures I have just explained.

Let us apply the explanation of Magnus to what occurs in pulmonary respiration. Venous blood, containing a certain amount of carbonic acid at the temperature of the blood and under a certain pressure, is brought to the capillaries, which are distributed on the walls of the air-vesicles in the lungs. In these air-vesicles, we have an atmosphere at a certain temperature and subject to a certain pressure. Setting temperature aside, as it may be assumed to be the same in the blood and in the air-cells, let us consider the question of pressure. If the pressure of the carbonic acid in the blood be greater than that of the carbonic acid in the air-cells, carbonic acid will escape until an equilibrium is established between the tension of the gas in the blood and the tension of the gas in the air-cells. Again if the tension of the oxygen in the air-cells be greater than that of the oxygen in the venous blood, oxygen will be absorbed until the tensions become equal. This theory has no doubt the merit of simplicity, but it will be observed that it depends entirely on the assumption that the gases are simply dissolved in the blood. It was pointed out by Liebig that according to the experiments of Regnault and Reiset, animals used the same amount of oxygen when breathing an atmosphere composed of that gas alone as when they breathed ordinary air, and that the vital processes are not much affected by breathing the atmosphere of high altitudes where the amount of oxygen taken in is only about two-thirds of that existing at the sea-level. It was also shown at a much later date, by Ludwig and W. Müller, that animals breathing in a confined space of air will use up the whole of the oxygen in the space, and it is clear that as the oxygen is used up, the partial pressure of the oxygen remaining must be steadily falling. Liebig urged the view that the gases were not simply dissolved in the blood, but existed in a state of loose chemical combination which could be dissolved by the diminished pressure in the vacuum, or by the action of other gases. He also pointed out the necessity of accurately determining the co-efficient of absorption of blood for the gases, that is, the amount absorbed under a pressure of 760 mm. of mercury by one volume of the gas at the temperature of the observation. The next important observations were those of Fernet, published in 1855 and 1857. He expelled the greater part of the gas of the blood (dog) by passing through it a stream of hydrogen and then submitting it to the action of the air-pump. He then introduced into the apparatus the gas under a given pressure, the absorption co-efficient of which he had to determine. He then estimated the amount of gas absorbed, under different pressures, and found in the case of oxygen that the amount absorbed with gradually decreasing increments of pressure was greater than what would have been the case had it been in accordance with Dalton's law of pressures. The oxygen was not then simply dissolved in the blood. Further, Fernet arrived at the conclusion that the greater portion of the oxygen was in a state of combination, whilst a small amount was simply dissolved according to Dalton's law.

It is evident, then, that while the amount of oxygen absorbed varies with the pressure, it does not do so according to Dalton's law. The amount decreases slowly with pressures below atmospheric pressure, and it increases rapidly with pressures above it. It is when the pressure in the vacuum is as low as one-thirtieth of an atmosphere that the oxygen is given up. The view that something in the blood is chemically united to the oxygen is strengthened by the fact that serum does not absorb much more oxygen than water can absorb, so that blood at a temperature of 30° C. would contain only about 2 volumes per cent. of oxygen gas were the latter simply dissolved in the fluid. It can also be shown that defibrinated blood takes up oxygen independently of the pressure, and that the quantity of oxygen taken up by defibrinated blood is about equal to the quantity absorbed by a solution of pure hæmoglobin containing as much of that substance as exists in the same volume of blood.

By similar experiments made with carbonic acid, Fernet determined that the greater portion of it was in a state of loose chemical combination, whilst a small amount was simply dissolved according to the law of pressures. Experiments with blood serum showed similar results as regards carbonic acid, with the difference that the co-efficient of absorption for oxygen was much less than with ordinary blood. He therefore concluded that nearly the whole of the carbonic acid was chemically retained in the fluid of the blood, whilst nearly the whole of the oxygen was combined with the red blood corpuscles. He then proceeded to investigate whether or not the three principal salts of the blood, carbonate of soda, phosphate of soda, and chloride of sodium, in any way influenced the absorption co-efficient of carbonic acid. He found (1) that the addition of these salts to distilled water in the proportion in which they exist in the serum slightly diminishes the absorption co-efficient; (2) that chloride of sodium has no influence on the absorption co-efficient; and (3) that carbonic acid combines with the carbonate and phosphate of soda.

In the same year (1855) Lothar Meyer published the results of a series of researches of the same nature. Under the direction of Bunsen, the blood was diluted with ten times its bulk of water, and the gases were collected by boiling the liquid *in vacuo* at a very gentle heat; a certain amount of gas was thus obtained. He also found that blood absorbs a much larger quantity of carbonic acid than pure water at the same temperature, and stated that when blood was exposed to oxygen at various pressures the quantity of that gas taken up might be regarded as consisting of two portions, one following Dalton's law and the other independent of it.

Further researches of a similar kind have been carried out by Setschenow, Ludwig, Alexander Schmidt, Bert, Pflüger, and others, and ingenious methods of collecting and of analyzing the gases have been devised. To Professor Pflüger and his pupils in particular are we indebted for the most complete series of gas analyses on record. The result has been to enable us to give the average composition of the gases of the blood as follows. From 100 volumes of dog's blood there may be obtained :—

* Address to the Physiological Section. From the *British Medical Journal*, August 18.

	Oxygen.	Carbonic Acid.	Nitrogen.
Arterial .	18·4 to 22·6, mean 20	30 to 40	1·8 to 2
Venous .	Mean 11·9	43 to 48	1·8 to 2

the gases being measured at 0° C. and 760 mm. pressure. The venous blood of many organs may contain less than 11·9 per cent. of carbonic acid, and the blood of asphyxia may contain as little as 1 volume per cent. It is clear, then, that the gases of the blood do not exist in a state of simple solution, but that they are largely combined with certain constituents of the blood. Take, for example, the case of oxygen. Berzelius showed long ago that 100 volumes of water will absorb, at a given temperature and pressure, 2·9 volumes of oxygen: while, in the same circumstances, 100 volumes of serum will absorb 3·1 volumes, and 100 volumes of blood will absorb 9·6 volumes. Something in the blood must have the power of taking up a large amount of oxygen.

The next step was the discovery of the important part performed in respiration by the colouring matter of the red blood corpuscles. Chemically, these corpuscles consist of about 30 to 40 per cent. of solid matter. The solids contain only about 1 per cent. of inorganic salts, chiefly those of potash; whilst the remainder are almost entirely organic. Analysis has shown that 100 parts of dry organic matter contain of hæmoglobin, the colouring matter, no less than 90·54 per cent.; of proteid substances, 8·67; of lecithin, 0·54; and of cholesterine, 0·25. The colouring matter, hæmoglobin, was first obtained in a crystalline state by Funke in 1853, and subsequently by Lehmann. It has been analysed by Hoppe-Seyler and Carl Schmidt, with the result of showing that it has a perfectly constant composition. Hoppe-Seyler's analysis first appeared in 1868. It is now well known to be the most complicated of organic substances, having a formula, according to Preyer (1871), of

$$C_{600}H_{960}N_{154}FeS_3O_{179}.$$

In 1862 Hoppe-Seyler noticed the remarkable spectrum produced by the absorption of light by a very dilute solution of blood. Immediately thereafter the subject was investigated by Professor Stokes, of Cambridge, and communicated to the Royal Society in 1864. If white light be transmitted through a thin stratum of blood, two distinct absorption bands will be seen. One of these bands next D is narrower than the other, has more sharply-defined edges, and is undoubtedly blacker. "Its centre," as described by Dr. Gamgee ('Physiological Chemistry,' p. 97), "corresponds with wave-length, 579,* and it may conveniently be distinguished as the absorption band α in the spectrum of oxy-hæmoglobin. The second of the absorption bands—that is, the one next to E, which we shall designate β, is broader, has less sharply defined edges, and is not so dark as α. Its centre corresponds approximately to W. L. 553·8. On diluting very largely with water nearly the whole of the spectrum appears beautifully clear, except where the two absorption bands aresituated. If dilution be pursued far enough even these disappear; before they disappear they look like faint shadows obscuring the limited part of the spectrum which they occupy. The last to disappear is the band α. The two absorption bands are seen most distinctly when a stratum of 1 cm. thick of a solution containing 1 part of hæmoglobin in 1000 is examined; they are still perceptible when the solution contains only 1 part of hæmoglobin in 10,000 of water."

Suppose, on the other hand, we begin with a solution of blood in ten times its volume of water; we then find that such a solution cuts off the more refrangible part of the spectrum, leaving nothing except the red, "or rather, those rays having a wave-length greater than about 600 millionths of a millimetre." On diluting further, the effects, as well described by Dr. Gamgee, are as follows: "If now the blood solution be rendered much more dilute so as to contain 8 per cent. of hæmoglobin, on examining a stratum 1 centimetre wide the spectrum becomes distinct up to Frauenhofer's line D (W. L. 589)—that is, the red, orange, and yellow are seen, and in addition also a portion of the green, between b and F. Immediately beyond D, and between it and b, however (between W. L. 595 and 518), the absorption is intense."

These facts were observed by Hoppe-Seyler. Professor Stokes made the very important contribution of observing that the spectrum was altered by the action of reducing agents. Hoppe-Seyler had observed that the colouring matter, so far as the spectrum was concerned, was unaffected by alkaline carbonates and caustic ammonia, but was almost immediately decomposed by acids, and also slowly by caustic fixed alkalies, the coloured product of decomposition being hæmatin, the spectrum of which was known. Professor Stokes was led to investigate the subject from its physiological interest, as may be observed on quoting his own words in the classical research already referred to:—"But it seemed to me to be a point of special interest to inquire whether we could imitate the change of colour of arterial into that of venous blood, on the supposition that it arises from reduction."

He found that:—

"If to a solution of protosulphate of iron enough tartaric acid be added to prevent precipitation by alkalies, and a small quantity of the solution, previously rendered alkaline by either ammonia or carbonate of soda, be added to a solution of blood, the colour is almost instantly changed to a much more purple red as seen in small thicknesses, and a much darker red than before as seen in greater thickness. The change of colour which recalls the difference between arterial and venous blood is striking enough, but the change in the absorption spectrum is far more decisive. The two highly characteristic dark bands seen before are now replaced by a single band, somewhat broader and less sharply defined at its edges than either of the former, and occupying nearly the position of the bright band separating the dark bands of the original solution. The fluid is more transparent for the blue and less so for the green than it was before. If the thickness be increased till the whole of the spectrum more refrangible than the red be on the point of disappearing, the last part to remain is green, a little beyond the fixed line b, in the case of the original solution, and blue some way beyond F, in the case of the modified fluid."

From these observations Professor Stokes was led to the important conclusion that:—

"The colouring matter of blood, like indigo, is capable of existing in two states of oxidation, distinguishable by a difference of colour and a fundamental difference in the action on the spectrum. It may be made to pass from the more to the less oxidized state by the action of suitable reducing agents, and recovers its oxygen by absorption from the air."

To the colouring matter of the blood Professor Stokes gave the name of cruorine, and described it in its two states of oxidation as scarlet cruorine and purple cruorine. The name hæmoglobin, given to it by Hoppe-Seyler, is generally employed. When united with oxygen it is called oxyhæmoglobin, and when in the reduced state it is termed reduced hæmoglobin, or simply hæmoglobin.

The spectroscopic evidence is, therefore, complete. Hoppe-Seyler, Hüfner, and Preyer have shown also that pure crystallized hæmoglobin absorbs and retains in combination a quantity of oxygen equal to that

* Dr. Gamgee gives the measurements of the wave-lengths in millionths of a millimetre.

contained in a volume of blood holding the same amount of hæmoglobin. Thus, 1 gram of hæmoglobin absorbs 1·56 cubic centimetre of oxygen, at 0° C., and 760 millimetres pressure; and, as the average amount of hæmoglobin in blood is about 14 per cent., it follows that $1{\cdot}56 \times 14 = 21{\cdot}8$ c.c. of oxygen would be retained by 100 c.c. of blood. This agrees closely with the fact that about 20 volumes of oxygen can be obtained from 100 volumes of blood. According to Pflüger, arterial blood is saturated with oxygen to the extent of 9-10ths, while Hüfner gives the figure at 14-15ths. By shaking blood with air, its oxygen contents can be increased to the extent of from 1 to 2 volumes per cent.

These important researches, the results of which have been amply corroborated, have given an explanation of the function of the red blood corpuscles as regards respiration. The hæmoglobin of the venous blood in the pulmonary artery absorbs oxygen, becoming oxyhæmoglobin. This is carried to the tissues, where the oxygen is given up, the oxyhæmoglobin being reduced. Thus, the colouring matter of the red blood corpuscles is constantly engaged in conveying oxygen from the lungs to the tissues. Probably the union of hæmoglobin with oxygen, and its separation from it, are examples of dissociation, that is, of a chemical decomposition or synthesis, effected entirely by physical conditions; but data regarding this important question are still wanting. If the union of oxygen with the colouring matter is an example of oxidation, it must be attended with the evolution of heat, but, so far as I know, this has not been measured. My friend Mr. J. T. Bottomley and I have recently been able, by a thermo-electric arrangement, to detect the heat produced by the union of hæmoglobin with oxygen. We mean to continue the investigation.* If heat were produced in considerable amount, the arterial blood returned from the lungs to the left auricle would be hotter than the blood brought to the right auricle by the veins. This, however, is not the case, as the blood on the right side of the heart is decidedly warmer than the blood on the left, a fact usually accounted for by the large influx of warm blood coming from the liver. The heat exchanges in the lungs are of a very complicated kind. Thus heat will be set free by the formation of oxyhæmoglobin; but, on the other hand, it will be absorbed by the escape of carbonic acid, and by the formation of aqueous vapour, and a portion will be used in heating the air of respiration. The fact that the blood in the left auricle is colder than that of the right auricle is, therefore, the result of a complicated series of heat exchanges, not easy to follow.

Our knowledge as to the state of the carbonic acid in the blood is not so reliable. In the first place, it is certain that almost the whole of the carbonic acid which may be obtained exists in the plasma. Defibrinated blood gives up only a little more carbonic acid than the same amount of serum of the same blood. Blood-serum gives up to the vacuum about 30 volumes per cent. of carbonic acid; but a small part—according to Pflüger, about 6 volumes per cent.—is given up only after adding an organic or mineral acid. This smaller part is chemically bound, just as carbonic acid is united to carbonates, from which it can be expelled only by a stronger organic or mineral acid. The ash of serum yields about one-seventh of its weight of sodium; this is chiefly united to carbonic acid to form carbonates, and a part of the carbonic acid of the blood is united to those salts. It has been ascertained, however, that defibrinated blood, or even serum containing a large number of blood corpuscles, will yield a large amount of carbonic acid, even without the addition of an acid. Thus, defibrinated blood will yield 40 volumes per cent. of carbonic acid—that is, 34 volumes which would be also given up by the serum of the same blood (without an acid), and 6 volumes which would be yielded after the addition of an acid. Something, therefore, exists in defibrinated blood which acts like an acid in the sense of setting free the 6 volumes of carbonic acid. Possibly the vacuum may cause a partial decomposition of a portion of the hæmoglobin, and, as suggested by Hoppe-Seyler, acid substances may thus be formed.

But what is the condition of the remaining 30 volumes per cent. of carbonic acid which are obtained by the vacuum alone? A portion of this is probably simply absorbed by the serum; this part escapes in proportion to the decrease of pressure, and it may be considered to be physically absorbed. A second part of this carbonic acid must exist in chemical combination, as is indicated by the fact that blood-serum takes up far more carbonic acid than is absorbed by pure water. On the other hand, this chemical combination is only a loose one, because it is readily dissolved by the vacuum. There can be no doubt that a part of this carbonic acid is loosely bound to carbonate of soda Na_2CO_3 in the serum, probably to acid carbonate of soda $NaHCO_3$. This compound exists only at a certain pressure. On a fall of pressure, it decomposes into sodium carbonate and carbonic acid, the latter becoming free. A third part of this carbonic acid is probably loosely bound chemically to disodium phosphate, Na_2HPO_4, a salt which also occurs in the blood-serum. Fernet has shown that it binds two molecules of carbonic acid to one molecule of phosphoric acid. This salt occurs in considerable quantity only in the blood of carnivora and omnivora, while in that of herbivora, such as in the ox and calf, only traces exist. It cannot be supposed in the latter instances to hold much carbonic acid in chemical combination. There must exist, therefore, other chemical substances for the attachment of the carbonic acid of the blood, and it has been suggested that a part may be connected with the albumin of the plasma.

According to Zuntz, the blood-corpuscles themselves retain a part of the carbonic acid, as the total blood is able to take up far more carbonic acid out of a gaseous mixture rich in carbonic acid or consisting of pure carbonic acid, than can be absorbed by the serum of the same quantity of blood. No compound, however, of carbonic acid with the blood-corpuscles is known.

The nitrogen, which is contained in the blood to the amount of from 1·8 to 2 volumes per cent., is probably simply absorbed, for even water is able to absorb 2 volumes per cent. of this gas.

If we then regard the blood as a respiratory medium having gases in solution, we have next to consider what is known of the breathing of the tissues themselves. Spallanzani was undoubtedly the first to observe that animals of a comparatively simple type used oxygen and gave up carbonic acid. But he went further, and showed that various tissues and animal fluids, such as the blood, the skin, and portions of other organs, acted in a similar way. These observations were made before the beginning of the present century, but they appear to have attracted little or no attention until the researches of Georg Liebig on the respiration of muscle,

* In reference to this passage the following note has been published:—"Dr. McKendrick was not then aware of an important research on this subject conducted in 1871 by his friend, Dr. Arthur Gamgee, and contained in a report to the British Association for the Advancement of Science in 1871. Dr. Gamgee, both by the use of thermometers and by thermo-electric arrangements, demonstrated the important fact that an evolution of heat accompanies the union of oxygen with hæmoglobin, and in the report referred to there is ample evidence that the research was conducted with great skill and with an appreciation of the difficulties to be surmounted. He arrived at the conclusion "that the mean rise of temperature during the absorption of oxygen amounted to 0°·0976 C. The maximum heating found was 0°·111 C., and the minimum 0°·083 C."

published in 1850. He showed that fresh muscular tissue consumed oxygen and gave up carbonic acid. In 1856, Matteucci made an important advance, by observing that muscular contraction was attended by an increased consumption of oxygen, and an increased elimination of carbonic acid. Since then, Claude Bernard and Paul Bert, more especially the latter, have made numerous observations regarding this matter. Paul Bert found that muscular tissue has the greatest absorptive power. Thus we arrive at the grand conclusion that the living body is an aggregate of living particles, each of which breathes in the respiratory medium passing from the blood.

As the blood, containing oxygen united with the colouring matter (hæmoglobin), passes slowly through the capillaries, fluid matter transudes through the walls of the vessels, and bathes the surrounding tissues. The pressure or tension of the oxygen in this fluid being greater than the tension of the oxygen in the tissues themselves, in consequence of the oxygen becoming at once a part of the living protoplasmic substance, oxygen is set free from the hæmoglobin, and is appropriated by the living tissues, becoming part of their protoplasm. Whilst alive, or at all events whilst actively discharging their functions, as in the contraction of a muscle, or in those changes we term secretion in a cell, the living protoplasm undergoes rapid decompositions, leading to the formation of comparatively simple substances. Amongst these is carbonic acid. As it has been ascertained that the tension of the carbonic acid in the lymph is less than its tension in venous blood, it is difficult at first sight to account for the absorption of carbonic acid by venous blood; but its tension is higher than that of carbonic acid in arterial blood, and it must be remembered that the lymph has had the opportunity, both in the connective tissue and in the lymphatic vessels, of modifying its tension by close contact with arterial blood. Strassburg fixes the tension of the carbonic acid in the tissues as equal to 45 mm. of mercury, while that of the venous blood is only 41 mm. We may assume that as the carbonic acid is set free, it is absorbed by the blood, uniting loosely with the carbonates and phosphates of that fluid, thus converting it from the arterial into the venous condition. This constitutes respiration of tissue.

In connection with the respiration of tissues, as determined by the analysis of the blood gases and of the gases of respiration, there arises the interesting question of the ratio between the amount of oxygen absorbed and the amount of carbonic acid produced, and very striking contrasts among animals have thus been determined. Thus in herbivora the ratio of the oxygen absorbed to the carbonic acid produced, or the respiratory quotient, as it is termed by Pflüger, $\frac{CO_2}{O}$, amounts to from 0·9 to 1·0, while in carnivora it is from 0·75 to 0·8. Omnivora, of which man may be taken as the example, come between, $\frac{CO_2}{O} = 0{\cdot}87$. The quotient is greater in proportion to the amount of carbohydrate in the diet, whether the animals are carnivora, herbivora, or omnivora. The respiratory quotient becomes the same about 0·75, in starving animals, a proof that the oxidations are kept up at the cost of the body itself, or, in other words, the starving animal is carnivorous. The intensity of respiration in different animals is well shown in the following table, in which the amount of oxygen used is given per kilogramme of body-weight per hour. (Dr. Immanuel Munk, 'Physiologie der Menschen und der Säugethiere,' 1888, p. 82.)

Smaller animals therefore have, as a rule, a greater intensity of respiration than larger ones. In small singing birds the intensity is very remarkable, and it will be seen that they require ten times as much oxygen as a hen. On the other hand, the intensity is low in cold-blooded animals. Thus a frog requires 135 times less oxygen than a small singing bird. The need of oxygen is therefore very different in different animals. Thus a guinea-pig soon dies with convulsions in a space containing a small amount of oxygen, while a frog will remain alive for many hours in a space quite free of oxygen. It is well known that fishes and aquatic animals generally require only a small amount of oxygen, and this in consonance with the fact that sea-water contains only small quantities of this gas. Thus, according to the elaborate researches of my friend, Professor Dittmar, on the gases of the sea-water brought home by the *Challenger* Expedition, collected in many parts of the great oceans, and from varying depths: "The ocean can contain nowhere more than 15·6 c.c. of nitrogen, or more than 8·18 c.c. oxygen per litre; and the nitrogen will never fall below 8·55 c.c. We cannot make a similar assertion in regard to the oxygen, because its theoretical minimum of 4·30 c.c. per litre is liable to further diminution by processes of life and putrefaction and processes of oxidation" (Dittmar, 'Proceedings of Phil. Soc. of Glasgow,' vol. xvi., p. 61). As a matter of fact, a sample of water from a depth of 2875 fathoms gave only 0·6 c.c. per litre of oxygen, while one from a depth of 1500 fathoms gave 2·04 c.c. per litre. Taking 15° C. as an average temperature, one litre of sea-water would contain only 5·31 c.c. of dissolved oxygen, that is about 0·5 c.c. in 100 c.c. Contrast this with arterial blood, which contains 20 c.c. of oxygen in 100 c.c. of blood, or there are about forty times as much oxygen in arterial blood as in sea-water. At great depths the quantity of oxygen is very much less, and yet many forms of life exist at these great depths. Fishes have been dredged from a depth of 2750 fathoms, where the amount of oxygen was probably not so much as 0·06 c.c. per 100 c.c. or 300 times less than that of arterial blood. Making allowance for the smaller quantity of oxygen in the blood of a fish than that of a mammal, it will still be evident that the blood of the fish must contain much more oxygen than exists in the same volume of sea-water. No doubt we must remember that the water is constantly renewed, and that the oxygen in it is in the state of solution, or, in other words, in a liquid state. But the question remains, where do these deep sea creatures obtain the oxygen? Probably by a method of storage. Biot has found in the swimming bladder of such fishes 70 volumes per cent. of pure oxygen, a gas in which a glowing splinter of wood is relit. This oxygen probably oxygenates the blood of the fish when it plunges into the dark and almost airless depths of the ocean.

Animals.	O in grams.	Respiratory Quotient. $\frac{CO_2}{O}$
Cat	1·007	0·77
Dog	1·183	0·75
Rabbit	0·918	0·92
Hen	1·300	0·93
Small Singing Birds	11·360	0·78
Frog	0·084	0·63
Cockchafer	1·019	0·81
Man	0·417	0·78
Horse	0·563	0·97
Ox	0·552	0·98
Sheep	0·490	0·98

Aquatic breathers, however, if they live in a medium containing little oxygen, have the advantage that they are not troubled with free carbonic acid. One of the most striking facts discovered by the *Challenger* chemists is that sea-water contains no free carbonic acid, except in some situations where the gas is given off by volcanic action from the crust of the earth forming the sea-bed. In ordinary sea-water there is no free carbonic acid, because any carbonic acid formed

is at once absorbed by the excess of alkaline base present. Thus the fish breathes on the principle of Fleuss's diving apparatus, in which the carbonic acid formed is absorbed by an alkaline solution. There is nothing new under the sun. The fish obtains the oxygen from the sea-water, no doubt, by the chemical affinity of its hæmoglobin, which snatches every molecule of oxygen it may meet with, while it gets rid of its carbonic acid easily, because there is not only no tension of carbonic acid in the sea-water to prevent its escape, but there is always enough of base in the sea-water to seize hold of the carbonic acid the moment it is formed. If we could get rid of the carbonic acid of the air of expiration as easily, we could live in an atmosphere containing a much smaller percentage of oxygen.

I have now placed before you the generally accepted doctrines regarding the chemical and physical problems of respiration. But one has only to examine them closely to find that there are still many difficulties in the way of a satisfactory explanation of the function. For example, is the union of hæmoglobin with oxygen a chemical or a physical process? If oxyhæmoglobin is a chemical substance, how can the oxygen be so readily removed by means of the air-pump? On the other hand, if it is a physical combination, why is the oxygen not absorbed more in consonance with the law of pressures? It is important to note that, as a matter of fact, hæmoglobin absorbs a quantity of oxygen nearly constant for ordinary temperatures, whatever may be the amount of oxygen present in the mixture of gases to which it is exposed. This is true so long as the amount of oxygen does not fall below a certain minimum, and it clearly points to the union of the hæmoglobin with the oxygen being a chemical union. Suppose we diminish the amount of oxygen in the air breathed, the partial pressure of the gas is of course also diminished, but it is evident that we might diminish the total pressure instead of diminishing the amount of oxygen. To avoid difficulties in respiration, when one is obliged to breathe an air deficient in oxygen, we ought to increase the pressure at which the air is breathed; and, on the other hand, to avoid danger in breathing air under a low pressure, we ought, theoretically, to increase the richness of the air in oxygen. Thus with a pressure of 760 mm. the air should contain, as it normally does, 21 per cent. of oxygen, while with a pressure of 340 mm. it should contain 46 per cent., and with a pressure of 250 mm. it should contain as much as 63 per cent. On this basis a pressure of 5 atmospheres should be associated with an atmosphere containing about 3 per cent. of oxygen. By increasing the pressure, we increase the quantity of oxygen by weight in a given volume.

The explanation is that in all of these cases the partial pressure of the oxygen is nearly the same—that is, not far from 157 mm. of mercury, and the general law is that for all kinds of breathing the pressure of the oxygen should be nearly that of the oxygen in ordinary atmospheric air. Whilst the absorbtion of oxygen by the hæmoglobin has nothing directly to do with the pressure, it is striking that any atmosphere contains enough oxygen by weight for the hæmoglobin in the blood, when the partial pressure of the oxygen is near 157 mm. On each side of this median line life can be supported with considerable differences of pressure. Thus the pressure may be gradually reduced until the point of the dissociation of oxyhæmoglobin is reached —that is to say, down to from $\frac{1}{10}$ to $\frac{1}{30}$ of an atmosphere. On the other hand, animals may breathe an atmosphere containing two or three times the normal amount of oxygen without appearing to be affected. This was first noticed by Regnault and Reiset, and the observation has been much extended by Paul Bert. The latter distinguished physiologist found that an increase even up to 8 or 10 atmospheres did not produce any apparent defect, but on reaching the enormous pressure of 20 atmospheres, death, with severe tetanic convulsions, was the result. He also showed that the additional increment of oxygen absorbed by the blood under the influence of each atmosphere of added pressure was very small. Thus, with a pressure of 1 atmosphere the amount of oxygen absorbed by the blood was about 20 per cent. by volume; a pressure of two atmospheres caused an increase of only 0·9 per cent., of 3 atmospheres 0·7 per cent., of 4 atmospheres 0·6 per cent., of 5 atmospheres 0·5 per cent., of 6 atmospheres 0·2 per cent., of 7 atmospheres 0·2 per cent., of 8 atmospheres 0·1 per cent., of 9 atmospheres 0·1 per cent., and of 10 atmospheres 0·1 per cent. Thus from 1 atmosphere to 10 atmospheres the increase was only to the extent of 3·4 per cent., so that the blood now contained 23·4 per cent. by volume instead of 20 per cent. These facts indicate that when all the hæmoglobin has been satisfied with oxygen it becomes indifferent, within limits, to any additional oxygen that may be forced into the blood under pressure, and thus the blood of animals breathing an atmosphere richer in oxygen than ordinary air is not more highly oxygenated than normal blood. The practical result also follows that it is of no use in the treatment of disease to cause patients to breathe an atmosphere richer in oxygen than ordinary air, because, at ordinary atmospheric pressure, no more oxygen can thus be caused to enter the blood, and if it be desirable to hyperoxygenate the blood, this can only be done by breathing oxygen, under a pressure of three or four atmospheres, in a chamber in which the body of the patient is subjected to the same pressure.

In this connection it is important to notice the enormous absorptive surface for oxygen presented by the red blood corpuscles of man. There are about 5,000,000 red corpuscles in each cubic millimetre. Each corpuscle has a superficial area of 0·000128 square millimetres. Taking the blood in the body of a man of average size at 4·5 litres, that is 4,500,000 cubic millimetres, the number of corpuscles is about 22,500,000,000,000, and this would give a superficial area of 2,880,000,000 square millimetres, or 2,880 square metres, or about 3,151 square yards—that is to say, the absorptive area of the blood-corpuscles is equal to that of a square having each side about 56 yards. The hæmoglobin in a red blood-corpuscle amounts to about $\frac{1}{1}\frac{2}{3}$ of its weight. The blood of a man of average size may be taken at 4536 grams, or about 10 lbs. Such blood contains about 13·083 per cent. of hœmoglobin, and 4536 grams will contain about 593 grams of hæmoglobin, or about $1\frac{1}{3}$ lb. As regards the iron, which is supposed to be an essential constituent of hæmoglobin, 100 grams of blood contains 0·0546 gram. It follows that the total amount, 4536 grams, contains about 2·48 grams, or nearly 39 grains. Twenty-five minims of the tinctura ferri perchloridi contain about 1 grain of pure iron, so it will be seen that not many doses are required to introduce into the body an amount of iron as large as exists in the whole of the blood.

The absorption of oxygen, therefore, probably takes place as follows: the inspired air is separated in the alveoli of the lung by delicate epithelial cells and the endothelial wall of the pulmonary capillaries from the blood which circulates in the latter. The exchange of gas takes place through these thin porous membranes, so that the velocity of the transit must be practically instantaneous. As the oxygen is bound loosely to the hæmoglobin of the corpuscles, the laws of diffusion can only have a secondary influence on its passage, and only so far as it has to pass into the plasma so as to reach the blood-corpuscles. The plasma will absorb, at 35° C., about 2 volumes per cent., if we take the coefficient absorption of the plasma as equal to that of distilled water. Many of the blood-corpuscles of the pulmonary blood have just returned from the tissues

with their hæmoglobin in the reduced state, and the latter at once withdraws oxygen from the plasma. In an instant more oxygen passes out of the pulmonary air into the plasma, from which the oxygen is again quickly withdrawn by the hæmoglobin of the corpuscles, and so on. It is interesting to note that, if the oxygen did not exist in loose chemical combination, it would only be absorbed, and its amount would depend on the barometrical pressure at the moment, and would follow each fluctuation of pressure through a range, say, of one-fourteenth of the total pressure. Such an arrangement could not fail in affecting health. If, on ascending a high mountain, say 15,000 to 20,000 feet above the level of the sea, the pressure sank to nearly one-half, the blood would then contain only half its normal quantity of oxygen, and disturbances in the functions of the body would be inevitable. High-flying birds, soaring in regions of the air where the pressure falls below half an atmosphere, would suffer from want of oxygen; but in deep mines and on high mountains men and animals live in a state of health, and the quick-breathing bird has a sufficient amount of oxygen for its marvellous expenditure of energy, because the amount of oxygen in the blood is independent of the factor which exercises an immediate influence on the gas contents of the fluid, namely, the partial pressure. Kempner has also proved that so soon as the amount of oxygen in the respiratory air sinks only a few per cents. below the normal, the consumption of oxygen by the tissues and the formation of carbonic acid also fall in consequence of the processes of oxydation in the body becoming less active.

It is a remarkable fact that, in certain circumstances, tissues and even organs may continue their functions with little or no oxygen. Thus, as quoted by Max Marckwald, in his work on the 'Innervation of Respiration in the Rabbit' (translated by T. A. Haig, with introduction by Dr. McKendrick. Blackie and Son. 1888), "Kronecker and MacGuire found that the heart of the frog pulsates just as powerfully with blood deprived of its gases as with that containing oxygen, while the blood of asphyxia, or blood containing reduced hæmoglobin, soon stops its action."

Further, Kronecker has found that dogs bear the substitution of two-thirds to even three-fourths of their blood by 0·6 per cent. solution of common salt, and Von Ott withdrew 14–15ths of the blood of a dog, and replaced the same with serum from the horse, free from corpuscles. For the first day or two after the transfusion, the dog had only 1–55th part of the normal number of red blood-corpuscles, so that it had only 1–55th part of its normal amount of oxygen. But this dog showed no symptoms except weakness and somnolency, nor did it suffer from distress of breathing, a remarkable fact when we consider that the blood of an asphyxiated dog still contains 3 per cent. of oxygen, and that it may show great distress of breathing when there is still 1–6th part of the normal amount of oxygen in its blood.

The conditions regulating the exchange of carbonic acid are quite different. We have seen that the carbonic acid is almost exclusively contained in the blood-plasma, the smaller part being simply absorbed, and the greater part chemically bound, a portion existing in a fairly firm combination with the sodic carbonate of the plasma, and another portion in a loose, easily decomposable combination with the acid sodium carbonate, and a third portion with the sodium phosphate. Carbonic acid is contained in air only in traces, and its tension in the air is almost nothing. The air contained in the lungs is not wholly expelled by each respiration, but a part of the air of expiration, rich in carbonic acid, always remains in the lung. It is evident, then, that by the mixing of the air of inspiration with the air in the alveoli, the latter will become richer in oxygen and poorer in carbonic acid. The air in the alveoli, however, will always contain more carbonic acid than atmospheric air. Pflüger and Wolffberg have found the amount of carbonic acid in alveolar air to be about 3·5 volumes per cent., therefore its tension will be $\frac{3{\cdot}5 \times 760}{100} = 27$ mm. of mercury. The tension of the carbonic acid in the blood of the right ventricle (which may be taken as representing venous pulmonary blood), amounts, according to Strassburg, to 5·4 per cent. = 41 mm. of mercury, and is 14 mm. higher than that in the alveoli. Carbonic acid will, therefore, pass by diffusion from the blood into the alveolar air until the tension of the carbonic acid has become the same in the blood and in alveolar air. Before the state of equilibrium is reached, expiration begins and removes a part of the air out of the alveoli, so that the tension of the carbonic acid again becomes less than that in the blood. During the expiration and the following pause, the elimination of carbonic acid continues. This physical arrangement has the advantage for diffusion, that by expiration the whole air is not driven out of the lungs, for, if expiration had emptied the lungs of air, the diffusion would have ceased altogether during expiration and the following pause, and diffusion have been possible only during inspiration. There would thus have been an incomplete separation of the carbonic acid from the pulmonary blood. But as air remains in the lungs, the stream of diffusion between pulmonary blood and pulmonary air goes on steadily and fluctuations occur only in regard to its velocity.

Any account of gaseous constituents of the blood would be incomplete without a reference to the ingenious theory recently advanced by Professor Ernst Fleischl v. Marxow, of Vienna, and explained and illustrated in his work 'Die Bedeutung des Herzschlages für die Athmung: Eine Neue Theorie der Respiration," a work distinguished alike by the power of applying a profound knowledge of physics to physiological problems, and by a keen and subtle dialectic. The author starts with the antagonistic statements that of all animal substances, hæmoglobin is the one which possesses the greatest affinity for oxygen, *or* that substances exist in the animal body which, at least occasionally, have a greater chemical affinity for oxygen than hæmoglobin possesses. If the tissues have a greater affinity for oxygen than hæmoglobin has, how is it that in the blood of animals that have died of asphyxia there is still a considerable quantity, in some cases as much as 5 volumes per 100 volumes of oxygen? It is well known that the blood of such animals invariably shows the spectrum of oxyhæmoglobin. The tissues then do not use up all the oxygen of the oxyhæmoglobin, and they cannot, therefore, have a stronger affinity for the oxygen than hæmoglobin has. On the other hand, as the tissues undoubtedly seize hold of the oxygen, and rob the hæmoglobin of it, it would appear as if they really had a stronger affinity for the oxygen. There is thus a contradiction according to Fleischl v. Marxow, and it shows that our theories as to the ultimate chemical changes of respiration are not valid.

It might be objected at this point that the death of an animal from asphyxia, while oxygen still remains in its blood, is no proof that the tissues have lost their power of removing oxygen from oxyhæmoglobin. It only indicates that certain tissues, probably those of the nervous centres, require more oxygen than is supplied to them and, therefore, this part of the bodily mechanism is arrested, with the result of somatic death. Other tissues still live, and use up oxygen so long as their vitality lasts. At the same time, I am willing to admit that it is a striking circumstance that the nervous tissues stop working before they have exhausted every atom of oxygen in the blood.

But if tissues have, as all admit, an affinity for

oxygen, and if, at the same time we grant, for the sake of argument, that this affinity is not strong enough to dissociate the oxygen from the oxyhæmoglobin, can we conceive any physical action which would, in the first place, perform the work of dissociation, and then present the oxygen to the tissues in a form in which they would readily take it up? Ernst Fleischl v. Marxow holds that he has discovered such an action or agency in the stroke of the heart. He founds his theory on some remarkable experiments, which may be readily repeated with an ordinary tight-fitting hypodermic syringe: 1. Immerse the syringe wholly in water, so as to exclude air. Place one finger over the nozzle, draw up the piston for about half the length of the syringe, and then suddenly remove the finger from the nozzle. The water will rush in, and gas will be given off in considerable amount, the water being quite frothy for a short time. This is what one would expect. 2. Then carefully empty the syringe of air and gently draw it half full of water; then place the finger on the nozzle and draw the piston up a little, so as to leave a vacuum above the water. In these circumstances a few large bubbles of gas will come off, but the water will not froth. 3. Empty the syringe thoroughly, fill it half full of water, raise it obliquely so that the knob at the end of the handle of the piston is above the water, strike the knob sharply with a piece of wood, using the latter as a mallet; then draw the piston up a little, so as to leave a vacuum above the fluid. You will now observe that so large an amount of gas is given off as to cause the fluid to froth. In this experiment, the percussion stroke has evidently altered the mode in which the gas escapes when a vacuum has been formed above it. These experiments may also be done by using a long barometer tube, with a stop-cock at one end, and an india-rubber tube communicating with a moveable mercury cistern (a bulb) at the other. By lowering and depressing the bulb, a Torricellian vacuum may be formed, and water may be admitted, as with the syringe. Of the effects of percussion, in these circumstances, there can be no doubt, and the experiments are extremely interesting from the physical point of view. Fleischl v. Marxow holds that when gases are dissolved in fluids, the condition is analogous to the solution of crystalloids. If a fluid containing gas is shaken, more especially by a sudden sharp stroke, the close connection between the molecules of the fluid and of the gas is rent asunder, and the gas molecules lie outside and between the molecules of fluid. A shock, therefore, converts a real solution into a solution in which the fluid and gaseous molecules are in juxtaposition; and, if a vacuum is formed soon after the stroke, small bubbles of gas make their appearance more readily than if a stroke had not been given.

He then applies this theory to the phenomena of the circulation and of respiration. Starting with the query why the stroke of the heart should be so sudden and violent, when a much slower and more prolonged rhythmic movement would have been sufficient to keep up the tension in the arterial system on which the movement of the fluid depends, he boldly advances the opinion that it serves for the separation of the gases. The blood is kept in motion by a series of quick, sudden strokes, because, for the taking up of the oxygen by the tissues, and the elimination of carbonic acid by the lungs, it is not sufficient that the blood runs steadily through the systemic and pulmonary circulations; and, therefore, a short, hard stroke is given to it immediately before it enters the lungs and immediately after it has left the lungs. These strokes liberate the gases from a state of solution, and they become mixed with the fluid in a state of fine dispersion. This condition of fine dispersion is favourable for the elimination of the carbonic acid by the lungs, and for the using up of oxygen by the tissues.

Fleischl v. Marxow then proceeds to state that loose chemical combinations may also be dissolved by shocks, the gas passing into a condition of fine molecular dispersion, and that a quick repetition of the shocks prevents a recombination. As examples of such loose combinations, he cites oxyhæmoglobin and the compounds of carbonic acid with the salts of the plasma. It is here, in my opinion, that the theory fails from want of experimental evidence. There is no proof that shocks, such as those of the contraction of the right and left ventricles, can liberate gases from loose chemical combinations such as those with which we have to deal, and it is somewhat strained to point to the explosion of certain compounds excited by strong mechanical shocks or by vibratory impulses.

Some of the applications of the theory are very striking. For example, Fleischl v. Marxow suggests that asphyxia occurs before the oxygen has disappeared from the blood, because it is held by the hæmoglobin so firmly that the tissues cannot obtain it. Thus, suppose no oxygen is admitted by respiration. It is well known that all the blood in the body passes through the heart and lungs in the time of one circulation, that is, in about twenty seconds; and we have it on the authority of Pflüger that in this time one-third of the oxygen is used up by the tissues. According to the percussion theory, the stroke of the left ventricle arterialises the blood, that is, liberates the oxygen from the hæmoglobin, and this arterialised blood is carried to the tissues. The hæmoglobin does not get sufficient time to recombine with the oxygen, because of the successive strokes of the heart and the vibrating thrill kept up in the arterial ramifications. The free oxygen is used up by the tissues in the capillary circulation, to the extent of one-third. After leaving the capillaries, the two-thirds of oxygen again recombine with the hæmoglobin, and in this condition return to the heart, along with one-third of hæmoglobin that has lost its oxygen. In ordinary circumstances this one-third would again obtain oxygen from the alveoli of the lungs, but if all the oxygen there has been used up, of course it cannot obtain any oxygen. The blood flows from the lungs to the left ventricle, when it is again arterialised, and again sent out through the arteries; but as there is now a large amount of free hæmoglobin present in the capillary circulation, it will seize hold of a part of the oxygen, and the tissues will obtain less than the usual supply. With each successive circulation, the amount of oxygen available for the tissues will become less and less, until the tissues receive none, because all the oxygen set free by each beat of the left ventricle is seized hold of in the capillary circulation by the reduced hæmoglobin. The tissues die from want of oxygen, because there is too much reduced hæmoglobin present, a substance having a greater affinity for oxygen than the tissues possess, a result that would probably occur, as in drowning, in the time of six or eight complete circulations, that is, in three or four minutes.

Time will not allow me to refer further to this ingenious theory, which still requires the proof that such shocks as those of the heart can liberate gases from the compounds that exist in the blood. In my opinion, Fleischl v. Marxow exaggerates the importance of the shock, while he underestimates the evidence of the spectroscope, which always shows the spectrum of oxyhæmoglobin even in arterial blood drawn from the neighbourhood of the heart, and kept from contact with the air. Nor can I accept his statement that the force of the stroke of the heart is practically the same in all classes of warm-blooded animals, and one can hardly imagine that the feeble stroke of the left ventricle of a mouse would be sufficient to liberate the oxygen from the oxyhæmoglobin of its blood. Further it may be urged that the conditions of the experiments with the syringe are very unlike those of the circula-

tion, more especially in the fact that the walls of the syringe are rigid, while those of the heart and vessels are yielding and elastic. Again, when an organ is supplied with a solution of oxyhæmoglobin from a pressure bottle, by a process of transfusion, the tissues will reduce the oxyhæmoglobin, and take up the oxygen without any kind of percussion action being brought into play.

Physiologists, however, cannot but treat with the greatest respect the experiments and reasoning of a physicist so able as Fleischl v. Marxow is known to be, and the theory will be thoroughly tested in every detail. I may be allowed to contribute an expression of deep interest in this brilliant speculation, and to say that I entirely agree with its author in accepting the suggestions of teleology in the investigations of such problems. While the rigid investigation of facts is no doubt one of the great methods of science, we must not forget that by asking questions as to the use or value of a particular physiological arrangement, we may obtain light as to the road along which investigations are to be pursued. This is the guiding star of Fleischl v. Marxow's speculation, and it has led him and other physiologists to scrutinize anew the theories of respiration now in vogue.

In this address we have had abundant evidence of the fact that physiology, in the solution of some of her problems, depends entirely upon the methods of chemistry and physics. The air-pump, the special advantages of the mercurial air-pump, the methods devised for collecting and analyzing the gases of the blood, the speetroscope, have all contributed important facts to our knowledge of respiration. The narrative placed before you also illustrates in a striking manner the relation of modern physiology to the physiology of our forefathers. The latter were engaged in observing and explaining the more obvious phenomena, whilst the modern physiologists are pushing their researches further, and are endeavouring to study the hidden phenomena, which, like a second order, lie behind these. I need scarcely add that even the results of modern research are not to be regarded as final. Although we see a little further and more clearly than those who went before, there is still uncertainty as to fact and obscurity as to explanation in most departments of physiological science, and not least as regards the function of respiration. Enough has been said to show that in the study of respiratory mechanisms we meet with numerous examples of the same wonderful adaptation of organic structure to physical conditions as may be traced in the mechanism of the eye and of the ear. The structure of a lung or of a gill is just as much adapted for the play of the physical laws regulating gases as the retina is tuned to the vibrations of the ether, or as the organ of Corti responds sympathetically to the waves of musical tone.

Linnean Society of New South Wales.

Some Reputed Medicinal Plants of New South Wales (Indigenous Species only).*

BY J. H. MAIDEN, F.L.S., ETC.

(*Concluded from page* 152.)

51. Mentha gracilis, R. Br., N. O. Labiatæ, 'B. Fl.,' v., 83.

"Native Pennyroyal."

Mr. Bäuerlen points out that this plant and *M. satureoides* are used (in the southern districts of New South Wales at least) by females in irregularities of the menses, with most satisfactory results. Either infusion or decoction is used. It should, however, be borne in mind that these two species are much more acrid than the European species of *Mentha* commonly used for a similar purpose, and therefore greater care should be exercised in their use.

Both herbs are strewn about floors and beds for the purpose of keeping away insects, and they are very efficient in driving away fleas and bugs.

Found in all the colonies except Western Australia and Queensland.

52. Mesembryanthemum æquilaterale, Haw., N. O. Ficoideæ, 'B. Fl.,' iii., 324.

"Pig's face" (owing to the fanciful shape of the fruits). "Berudur" of the aboriginals of the Lachlan River.

Many species, and especially *M. acinaciforme*, Linn., from which this species scarcely differs, are used in South Africa. There the expressed juice of the succulent leaves taken internally checks dysentery, and acts as a mild diuretic, while it is also for its antiseptic property used as an excellent gargle in malignant sore throat, violent salivation, and aphthæ, or in the form of a lotion in burns and scalds (Bailey in 'Syn. Qd. Flora').

This plant is found near the coast in all the colonies.

53. Mucuna gigantea, D. C., N. O. Leguminosæ, 'B. Fl.,' ii., 254.

Used in India in rheumatic complaints. The bark for this purpose is pulverized, mixed with dry ginger, and rubbed over the parts affected (Rheede).

The plant extends from this colony to Northern Australia.

54. Myriogyne minuta, Less. (including *Centipeda orbicularis*, Lour., and *C. Cunninghami*, F. v. M., recorded by Baron Mueller in his 'Census,' p. 84, as distinct species. See also Muell. 'Fragm.,' viii., 143). N. O. Compositæ, 'B. Fl.,' iii., 553.

Called "Sneezeweed" in southern New South Wales.

The following letter from the Rev. Dr. Woolls (then of Richmond, N.S.W.), to the Editor of the *Sydney Morning Herald*, appeared in that journal on Christmas Day, 1886. I give it in full, as if the plant only partially realizes the expectations formed of it, it will be a valuable addition to our indigenous vegetable materia medica.

"Some weeks since the Rev. S. G. Fielding, of Wellington, called my attention to a weed (known to botanists as *Myriogyne minuta* of the Composite Order), which he said had been used with success in cases of blight. Being anxious to test the efficacy of the remedy, and to ascertain whether any bad effects would arise from its application, I placed some of it in the hands of Dr. Jockel of this town, who has furnished me with the following remarks:—'I have much pleasure in testifying to the efficacy, in cases of ophthalmia, of the plant which you so kindly sent me. A case came under my notice a few days ago of a drover who was suffering from a severe form of purulent ophthalmia, contracted up the country. I made an infusion of the plant according to the directions, and the first local application seemed to have almost a magical effect. The man expressed himself as relieved at once of the intense smarting which he had previously suffered. He got on so well that in two days he was able to start back up country again, and could hardly express his gratitude for the very great relief afforded. Louis C. Jockel.'

"I find from a communication of Baron Mueller, that for some time past he has had an idea that *Myriogyne* might be used for medicinal purposes, and that he had actually submitted it to Dr. Springthorpe, an eminent physician in Melbourne, for purposes of experiment. The Baron, however, was not aware of its efficacy in simple ophthalmic inflammation, and he regarded the discovery as interesting. I mention this as a matter of justice to Dr. Jockel, who, I believe, is the first medical man in Australia who has proved the value of *Myriogyne* in a case of ophthalmia. This weed, growing

* From vol. iii. (Series 2nd) of the 'Proceedings of the Linnean Society of New South Wales,' March 28, 1888.

as it does on the banks of rivers and creeks, and in moist places, is common to all the Australian colonies and Tasmania, and it may be regarded as almost co-extensive with the disease which it is intended to relieve. In the document relating to the Intercolonial Exhibition of 1886–7, it is noticed as remarkable for its sternutatory properties, and recommended for the manufacture of snuff."

The Rev. Mr. Hartmann says (Brough-Smyth's 'Aborigines of Victoria,' ii., 173) that this plant is used as medicine by the aborigines of Lake Hindmarsh, but he does not say for what complaint.

Baron Mueller prepared a snuff from this plant many years ago.

This plant is also found in India, Madagascar and Japan. The natives of India consider it a hot and dry medicine, useful in paralysis, pains in joints, and special diseases; also as a vermifuge ('Cyclop. of India').

55. PETALOSTIGMA QUADRILOCULARE, F. v. M., N. O. Euphorbiaceæ, 'B. Fl.,' vi., 92.

"Crab tree," "Native Quince," "Emu apple," "Bitter bark," "Quinine tree." Called "Muntenpen" by some Queensland aboriginals.

The bark contains a very powerful bitter, said to have the same properties as Cinchona (Hill). Tenison-Woods, however, states ('Explorations in Northern Australia') "It is usually covered with fruit like a small yellow plum, of eminently nasty taste. This is, I believe, its only claim to be called 'Quinine.'"

The stem-bark contains, together with the ordinary plant constituents, a camphoroidal essential oil, and an indifferent bitter principle belonging to the glucosides (Falco, in Watts' 'Dict.,' vi., 1st Suppl., 904, where an analysis of the ash of the bark is also given).

This plant extends from New South Wales to Northern Australia.

56. PIPER NOVÆ-HOLLANDIÆ, Miq., N. O. Piperaceæ, 'B. Fl.,' vi., 204.

"Native Pepper."

An excellent stimulant tonic to the mucous membrane. Used by Dr. Bancroft, of Brisbane, in the treatment of gonorrhœa and other mucous discharges with considerable success.

This is one of the largest native creepers, the root being at times from six inches to a foot in diameter. The plant climbs like ivy to the top of the highest trees, and when full grown weighs many tons, so that a good supply of the drug is readily obtainable. The active principle, as dissolved out by ether, is a brownish, oily fluid, soluble in water to a limited extent only, the insoluble portion producing an oily emulsion. It has a warm, aromatic, pleasant taste, and a benumbing effect on the tongue when applied to it in minute quantity (Bancroft).

This plant is also found in Queensland.

57. PITTOSPORUM UNDULATUM, Vent., N. O. Pittosporeæ, 'B. Fl.,' i., 111.

"Native Laurel," "Mock Orange."

I am not aware that this plant is employed medicinally, but an interesting account (perhaps paving the way for its economic application) of *Pittosporine*, a bitter glucoside obtained from the bark by Baron Mueller and L. Rummel, will be found in Wittstein's 'Organic Constituents of Plants.' This tree is found in all the colonies except South and Western Australia.

58. PLUMBAGO ZEYLANICA, Linn, N. O. Plumbagineæ, 'B. Fl.,' iv., 267.

In India a tincture of the root-bark has been employed as an antiperiodic. Dr. Oswald states that he has employed it in the treatment of intermittents with good effect. It acts as a powerful sudorific ('Pharm. of India').

It is a common medicine for dyspepsia in India. It is also frequently used as a poultice for abscesses.

It extends from New South Wales to Northern Australia.

59. POLANISIA VISCOSA, D. C. (*Cleome viscosa*, Linn. in Muell. 'Cens.,' p. 4), N. O. Capparideæ, 'B. Fl.,' i., 90.

This plant is used by the aboriginals to relieve headache (Mr. H. W. Stone, quoted by Mr. F. M. Bailey). It is also used in Cochin-China as a counter-irritant, in the same way as sinapisms in Europe, and also as a vesicant, and in the United States the roots are said to be used as a vermifuge. In India the leaves boiled in ghee (clarified butter) are applied to recent wounds, and the juice to ulcers. The seeds are occasionally given in fevers and diarrhœa (Ainslie, Lindley).

This plant is found in all the colonies except Victoria and Tasmania.

60. PORTULACA OLERACEA, Linn., N. O. Portulacaceæ, 'B. Fl.,' i., 169.

The common "Pig-weed" or "Purslane" of England.

This plant is a native of most warm parts of the world. It has been cultivated from very ancient times, and possesses antiscorbutic properties. The young shoots are sometimes put in salads, and the older ones are used as a potherb, or for pickling.

Found in all the colonies except Tasmania.

61. PTERIS AQUILINA, Linn., var. ESCULENTA (*P esculenta*, Forst.), N. O. Filices, 'B. Fl.,' vii., 731.

"Brake Fern" or "Bracken."

The European plant is astringent, bitter and anthelmintic, and the rhizome has been used as a substitute for hops.

The Australian variety is found in all the colonies.

62. RHIZOPHORA MUCRONATA, Lam., N. O. Rhizophoreæ, 'B. Fl.,' ii., 493.

A "Mangrove."

The bark has been tried medicinally in cases of hæmaturia, but with what result I have been unable to learn.

For notes on the medicinal utilization of the astringency of this tree, see *Pharm. Journ.*, vi., 11.

Found from this colony to Northern Australia.

63. SARCOSTEMMA AUSTRALE, R. Br., N. O. Asclepiadeæ, 'B. Fl.,' iv., 328.

Used by the Port Darwin natives as a remedy in small-pox (Bailey). In the interior districts of New South Wales its milky juice is used by white men as an application to wounds.

Found in all the colonies except Victoria and Tasmania.

64. SEBÆA OVATA, R. Br., N. O. Gentianeæ, 'B. Fl.,' iv., 371.

This little annual can be utilized for its bitter, tonic principle. Uses same as *Erythræa australis* (q.v.).

This plant is found in all the colonies.

65. SIDA RHOMBIFOLIA, Linn., N. O. Malvaceæ, 'B. Fl.,' i., 196.

"Queensland hemp." Called "Paddy Lucerne" on the Richmond and Clarence Rivers, New South Wales, and "Lucerne" in other parts of the colony (cows being very fond of it).

This herb is largely used by the natives of India in consumption and rheumatism. It is given as an infusion, and is said to promote perspiration, and the leaves are used as a poultice for snake-bites and in cases of the stings of wasps and other insects. It contains a quantity of mucilage, which no doubt accounts for its use in the diseases of the chest. ('Pharm. of India'). In some parts of this colony the plant bears the name of "Jelly leaf," in allusion to its mucilaginous nature.

Found in South Australia, and from New South Wales to Northern Australia.

66. SMILAX GLYCYPHYLLA, Smith, N. O. Liliaceæ, 'B. Fl.,' vii., 7.

"Native Sarsaparilla," "Sweet Tea."

This plant has been recommended as an alterative, tonic, and antiscorbutic. This is one of the earliest

plants pressed into the service of medicine in New South Wales. At p. 230, 'Journal of a Voyage to New South Wales,' by John White, Esq., Surgeon-General to the Settlement, London, 1790 (the information must have been furnished almost immediately after the foundation of the colony), occurs the passage, ... "good for the scurvy. The plant promises much in the last respect from its bitter as a tonic, as well as the quantity of saccharine matter it contains." The decoction is made from the leaves, and is similar in properties, but more pleasant in taste, than that obtained from the roots of *S. officinalis* or Jamaica Sarsaparilla. See a paper by Professor Rennie, of Adelaide, on "Glycyphyllin," the sweet principle of this plant, in *Journ. Chem. Soc.*, December, 1886.*

The herb is a common article of trade amongst Sydney herbalists.

Found also in Queensland.

67. SOPHORA TOMENTOSA, Linn., N. O. Leguminosæ, 'B. Fl.,' ii., 274.

"Sea-coast Laburnum."

Mr. F. M. Bailey states that the roots and seeds have been considered as specifics in bilious sickness.

This plant extends from New South Wales to Northern Australia, but it is not endemic in Australia.

68. TABERNÆMONTANA ORIENTALIS, R. Br., N. O. Apocyneæ, 'B. Fl.,' iv., 311.

"Bitter bark."

This small tree has an intensely bitter bark, and a decoction of it is sometimes sold as "bitters."

It extends from New South Wales to Northern Australia.

69. TEPHROSIA PURPUREA, Pers., N. O. Leguminosæ, 'B. Fl.,' ii., 209.

This plant is used in many tropical countries for the purpose of stupefying fish for the sake of capturing them.

In India the plant is described as a deobstruent and diuretic, useful in cough and tightness of the chest, bilious febrile attacks, obstructions of the liver, spleen and kidneys; the natives recommend it as a purifier of the blood, and for boils, pimples, etc. (Dymock).

Found also in South Australia, and in Queensland and in North Australia.

70. TYPHA ANGUSTIFOLIA, Linn., N. O. Typhaceæ, 'B. Fl.,' vii., 159.

A "bullrush."

The root stock, which abounds in starch, is somewhat astringent and diuretic, and is employed in Eastern Asia in dysentery, gonorrhœa, and measles.

Found in all the colonies.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE AMOUNT OF WATER OF CRYSTALLIZATION IN MORPHINE.

SIR,—In the *Pharmaceutical Journal* of August 25, there is a note on "The Amount of Water of Crystallization in Morphine" by O. Hesse, who claims to have settled the question in favour of the generally received formula. The question, however, is not so easily settled. I never considered that I had proved that morphine hydrate has the composition $8C_{17}H_{19}NO_3,9H_2O$, but only that I had shown it to be extremely probable; and I may add that my opinion is not in the least degree altered by what Dr. Hesse has written. Dieterich found rather less water than I did, but that is not surprising, as his time of drying for such a substance is obviously too long. It has not been noted that Dr. Squibb (*Ephemeris*, June, 1888) found almost exactly the same number for loss at 100° as I did, even when the morphine had been previously dried at 50°. It may be objected that Dr. Squibb's experiments were conducted on impure morphine, viz., that obtained in assaying opium, but his results are nevertheless of considerable value.

Hesse explains our high figures by assuming that the morphine with which we worked contained water mechanically entangled or occluded in the crystals, and says that we ought to have rubbed the crystals to powder in order to obviate this source of error. I did not think of powdering the precipitated morphine, as it was already in an impalpable powder, while even that crystallized from alcohol was in extremely small crystals. Everyone knows that large crystals are liable to retain portions of the mother-liquor in their interstices, but I find great difficulty in believing that the same holds good to a serious extent with microscopic crystals. In the case of a salt which effloresces or loses part of its combined water when exposed to the air under ordinary conditions, it is futile to fix an arbitrary period of hours or days during which it should be air-dried to get rid of adhering moisture. The only way of dealing with such a salt is to catch it at the moment it is just sensibly or apparently dry, when it may be assumed to have lost its adhering moisture, and yet still retain the whole of its combined water. According to Hesse's own experiment, after the second 48 hours, the water found in the morphine was less than required for one molecule. He does not tell us whether after another 48 hours the amount was still less, but we may assume it to be so. In short, the substance was slowly losing its combined water in the air, and we have no proof whatever that it had not to some extent effloresced at the first weighing. Certainly the heat developed by grinding the morphine to a powder would tend to cause loss of water of hydration. It is just possible that morphine hydrate separates with varying proportions of water, according to the conditions of its formation, as is known to be the case with several salts. Whatever may be doubtful, two things are clear to me, that Hesse has neither proved my view to be erroneous, nor his own view to be correct.

Edinburgh. D. B. DOTT.

THE SIZE OF PILLS.

SIR,—I am afraid the unwritten law regulating the size of pills for which no excipient is ordered, and which from their nature contain very small doses, is not followed to the extent which has been supposed. In the test dispensing introduced in class towards the close of each session, no directions are given, the result being *tot homines tot magnitudines.*

These young dispensers represent firms from various parts of England, Wales, and Scotland.

From this circumstance I draw the conclusion that, practically, there is no generally recognised form.

I have determined to adopt a one grain pill for all formulæ containing so-called minimum doses, in which the dispenser is left to his own discretion, and hope that this arrangement may prove satisfactory.

Würzburg. JOSEPH INCE.

Lloyd.—There is no word with an initial "R." in the title.

Juglans.—Please send more information as to the nature of the article.

W. J. Shepperd.—*Caryocar butyrosum*, or "butternut."

A. B. C.—*Geranium sp.*

Guttridge.—(1) *Œnanthe crocata*: a root and stem-leaf should always accompany umbelliferous flowers. (2) *Sparganum ramosum.* (3) *Scutellaria galericulata.* (4) *Stachys Betonica.* (5) *Lycopus europœus.* (6) *Mentha aquatica*, probably: send a larger specimen. (7) *Centaurea nigra.*

W. Stones.—Consult a dealer in medical books.

Phylloxera.—Probably bisulphide of carbon is meant.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Brown, Powell, Sullivan, Hart, Bennett, Foster, Parsons, Ball, Gerrard, Draper, Exeo.

* See also an investigation on the same substance by Mueller and Rummel in Wittstein's 'Organic Constituents of Plants.'

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ENGAGEMENTS WANTED.

TEMPORARY. Town or country. From Sept. 2nd. STATIM, 151, Nevill Rd., Stoke Newington.

ASSISTANT or DISPENSER. Temporary, permanent. Age 23. Good experience. References. Disengaged Sept. 8. CHEMIST, 14, Gibson Sq., Islington.

ASSISTANT. 9 years' good varied experience. ASSISTANT, 120, Salop St., Wolverhampton.

AS ASSISTANT. Age 29. Height 5ft. 11in. 13 years experience in Prescribing, Dispensing, and light Retail. EDWARDS, 16, Hampstead Rd., N.W.

JUNIOR. 5ft. 10in. 5 years' experience. London or suburbs preferred. C. H. KITCHING, 4, Leamington Ter., Southend Rd., Beckenham.

ASSISTANT or MANAGER. Out-door. Qualified. Age 28. Height 5ft. 9in. Single. London experience. H. P., 2, Carrington St., Kettering.

MANAGER or Senior ASSISTANT. Major. Good experience. References. A. EVERARD, Bishop's Stortford.

JUNIOR. 21. In good Dispensing business. Experienced. DAVIES, Talgarreg, Llandyssil, Carmarthen.

AS evening DISPENSER to Surgeon. J., 65, Rosemary Rd., Peckham, S.E.

TEMPORARY or branch MANAGER. Good Prescriber. Extract Teeth. Salary moderate. Good references. Abstainer. ANTHEM, 5, Auboro St., Scarborough.

MANAGER or LOCUM. Qualified. Single. Disengaged Sept. 1st. R. D., 7, Gresham St., E.C.

ASSISTANT. Age 22½. 5½ years experience. London and country. DAVIES, 2, Market Pl., King's Rd., Fulham, S.W.

MANAGER of branch, with view to purchase, by middle-aged gentleman. Country preferred. P., Broughton-in-Furness, Lancs.

ASSISTANT or DISPENSER. 5 years with Dispensing and Homœopathic Chemist. Passed Preliminary 4 years' ago. Height 5ft. 7in. Total abstainer. Churchman. Good references. L. PRIESTLEY, Forest View, Noel St., Nottingham.

AS ASSISTANT in a good Dispensing business. Qualified. Age 23. Good references. J. WRIGHT, 51, Mill St., Macclesfield.

AS MANAGER. Qualified. Thoroughly experienced. Middle aged. Married, no family. D., Wright, Layman & Umney, Southwark St.

CHEMIST & DENTIST. Thoroughly competent. DENTIST, 4, Little Saville Pl., Lambeth.

TEMPORARY. Qualified. Good address. Disengaged Sep. 3. DENTIST, 183, Kennington Cross, S.E.

JUNIOR. Height 5ft. 7in. Age 24. 7 years experience. Knowledge of postal duties. A. DAVEY, Warmington, Oundle, Northants.

JUNIOR. 5 years. Age 21. Mixed business preferred. Good references. COOKE, Aston, Wem.

TEMPORARY or PERMANENT. Good references and appearance. Age 28. Height 5ft. 10in. F. H., 3, Gloucester Terrace, Newbury.

MANAGER. Qualified. First-class reference. Particulars to CHEMIST, Trinity Sq., Llandudno.

JUNIOR in good class Dispensing business. London. 6ft. 2in. 4 years' experience. R. H., Barron, Squire & Co., Bush Lane, E.C.

JUNIOR. Age 20. Height 5ft. 5in. 5½ years' experience. London preferred. Disengaged. GREEN, Prestongate, Hessle, Hull.

MANAGER or ASSISTANT. Major qualification. Age 28. Height 5ft. 10½in. First-class experience. T., 6, Broad St., Hereford.

ENGAGEMENTS WANTED.

AS MANAGER or Branch Manager. Age 28. Married, no family. Qualified. Good Prescriber and Dispenser, can Extract, thoroughly competent. In or near London. To live on premises preferred. 5 years' reference as Manager. Good testimonials. Moderate salary. 80, Earl St., Edgware Rd., London.

YOUNG man seeks situation as DISPENSER or IMPROVER. Good references. Passed Prelim. Exam. Age 20. Experienced. E. S., 51, Green Rd., Southsea.

IMMEDIATELY. MANAGER or ASSISTANT. Qualified. Age 32. 18 years' experience. London and country. Prescribe, &c. Good references. Married. London preferred. G. S., 1, Victoria Rd. South, Southsea.

STUDENT. Disengaged, wishes to obtain employment in a good house during afternoon and evening. Salary moderate. Age 22. Good references. STUDENT, St. John's Lodge, Clapham Rise, S.W.

SENIOR or MANAGER. Thoroughly competent. Height 6ft. Age 33. Married, no family. Highest references. Disengaged September 20th. MANAGER, 3, Tennison St., York Rd., S.E.

DISPENSER to Surgeon or Chemist's. Part-time. CHEMICUS, 32, Union Rd., S.E.

IMPROVER or DISPENSER. Manchester preferred. R. H. WILLIAMS, 36, Rumford St., Manchester.

TEMPORARY. Town or Country. Moderate terms. Experienced. STATIM, 56, Kingsbury Rd., Islington, N.

ASSISTANTS WANTED.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

ASSISTANT. Minor qualification. Single. Age about 25. Accustomed to Prescribing and good general business. In-doors. D., 244, Westminster Bridge Rd., London, S.E.

DISPENSER (non-resident) required at the TAUNTON AND SOMERSET HOSPITAL. Salary £80 a year. Candidates must be qualified under the Pharmacy Act. Applications, with copies of testimonials, to be sent to the House Surgeon, on or before Saturday, September 8th.

BY middle of September. JUNIOR or IMPROVER, with experience in Dispensing. Must be quick, obliging, and of good address. Apply personally, 128, Balls Pond Rd., Mildmay Park, N.

BY September 15th. A sharp business Man. Not under 23. Used to Prescribing and Tooth Extracting. As outdoor ASSISTANT. Breakfast and Tea provided. Send full particulars, including salary and references, to ARTHUR KEELING, Chemist, Walthamstow. There is a vacancy for an APPRENTICE.

ASSISTANT to manage Branch. Age about 25. Minor qualification. Indoors. One requiring a permanency. Wanted about September 7th. Apply with full particulars, J. HOLLIDAY, Chemist, Warwick.

AN ASSISTANT, about 24 years of age, for a good Dispensing and light Retail business. Applications by letter will please state the length of time in last situation and salary received, with usual particulars. R. B. BETTY, Pharmaceutical Chemist, 1, Park St., Glo'ster Gate, Regent's Park, London.

MANAGING ASSISTANT, about 25, to take charge of a good class suburban business. Must have passed Minor. A Junior ASSISTANT also required. State age, height, experience, salary required, etc., to MATTHEWS & SON, Chemists, Leytonstone.

ASSISTANTS WANTED.

PHILLIPS & WORTS, Ealing, W., require a JUNIOR, qualified and accustomed to Dispensing. Two hours daily at Hospital Dispensary. Applicants please send age, height, experience, salary and photo, to be returned.

A COMPETENT JUNIOR ASSISTANT for two or three weeks from September 8th, in Retail and Dispensing business. Applicants from London or near. Remuneration, £1 weekly. Indoors. Apply with usual particulars, A. SAUNDERS, Orford Rd., Walthamstow.

JUNIOR ASSISTANT. Well up in Dispensing. Four others employed. Apply with full particulars and photo to NELLA, Messrs. Burgoyne & Co., Coleman St.

SEPTEMBER 24th. A trustworthy JUNIOR of good address and industrious habits. Must be reliable Dispenser and Prescriber. State age, height, experience and salary required. Indoors. Enclose photo to be returned. HAROLD MITCHELL, The Merton Pharmacy, South Wimbledon.

JUNIOR ASSISTANT. To Manage a Branch in large Village. Good Prescriber, well recommended, and used to a Mixed Country Trade. Abstainer preferred. Ample time for study. Apply, enclosing photo to A. P. S., care of Lofthouse and Saltmer, Hull.

JUNIOR ASSISTANT, or an IMPROVER treated with who has had some experience in dispensing. Time and assistance given to prepare for exam. Small salary. Address, ASSOCIATE, care of Messrs. Hodgkinsons & Co., 198, Upper Whitecross St., E.C.

AN ASSISTANT, about 22 years of age, accustomed to a good-class Retail. Must be an accurate Dispenser. Apply, stating height, age, salary, with reference, and carte de visite (to be returned), to T. E. MILLIDGE, 124, High St., Tonbridge.

A GENTLEMAN with a city engagement requires an ASSISTANT with Minor qualification. Able to Prescribe and Extract Teeth. A total abstainer preferred. Address, H. S. J., Cowslip Cottage, 157, Camberwell Grove, S.E.

AN ASSISTANT for an agricultural and family trade State age, height, salary, with other particulars, indoors. Messrs. WILLIAMS, Hereford.

MESSRS. WAITE, KITE & CODLING, Cheltenham, require, about the end of September, as ASSISTANT, a gentleman who has been accustomed to a first-class Dispensing business, and whose references are unexceptionable. Applicants to state full particulars of qualification, age, height, and salary required, and enclose photograph.

IMMEDIATELY.—In-door ASSISTANT. Must be a good Counterman, Dispenser and Prescriber. Apply, enclosing photo (to be returned), stating age, height, and salary required, with last reference. Abstainer preferred. J. HUGHES, Bognor-on-Sea.

DENTAL and Chemist's ASSISTANT within a few weeks. Must have been accustomed to good class business, and understand Mechanical Dentistry. Salary and commission. Send full particulars with photo to be returned to REFLEX, Messrs. Hearon, 5, Coleman St., London.

A SURGEON'S DISPENSER. One capable of Prescribing and attending a case of Midwifery in an emergency would be preferred. Character must bear strictest investigation. Apply, 102, Chobham Rd., Stratford, E., between 5 and 6 p.m.

SENIOR ASSISTANT. In-doors. Permanency. Not under 30, and single. Must be thoroughly competent to take sole management in proprietor's absence of a big West End cash business. 8 assistants. Full particulars as to salary, experience, &c., with carte, to X., Messrs. Hodgkinsons & Co., 198, Upper Whitecross St., E.C.

ASSISTANTS WANTED.

ASSISTANT, in a good class business. One only kept. Good Dispenser. State full particulars, and enclose photo (to be returned), to GEO. TAYLOR, Chemist, Bournemouth.

GOOD JUNIOR ASSISTANT (indoor), for mixed business. Energetic, good dispenser and counterman. Protestant. Usual particulars with photo, which will be returned, to J. B., 5, Kaludah Terrace, Widnes, Lancs.

JUNIOR or IMPROVER of not less than 3 years' experience, for light retail and dispensing. State age, height, salary required, and send carte (to return). References must be good. CHEMICUS, care of Hearon & Co., 5, Coleman St.

SENIOR ASSISTANT. In-door. Age 30 to 40. A thoroughly responsible, energetic man for a first-class West-End business. Apply by letter, with usual particulars and salary required, to EDWARD C. PERKS, 1, Sloane Sq., S.W.

BUSINESSES FOR DISPOSAL.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

BIRMINGHAM.—Immediately. An old-established Retail and Prescribing BUSINESS. Grand opportunity for a pushing man, no store business having been transacted. Owner retiring. Stock, fixtures and goodwill about £600. Commanding premises in a populous neighbourhood. Rare opportunity for a Druggist. Apply, WILLIS, Agent, 21, Cannon St., Birmingham.

SEASIDE, South Coast.—Good Dispensing and RETAIL. Recently established in new and fashionable part. Returns, under management, increasing annually. Handsome modern fittings (Howlett's) and stock all well selected. Price about £300, the value of stock and fixtures, lease (21 years) included. S., care of Barron & Harvey, London.

THE BUSINESS of a Chemist and Druggist, situate in a populous village in Lincolnshire. Returns about £500. Price £300, or valuation. Apply, J. MALTBY, Valuer, Lincoln.

20 MILES from London.—A good class old-established Retail and Dispensing BUSINESS. The shop is handsomely and modern fitted, and there is a good residence. The returns are over £900. Price £650. Address, H. B., 28, Blackheath Hill, Kent.

RETAIL, Prescribing and DENTAL. Busy neighbourhood. Good position for an Open Surgery. Capable of great increase. Rent £50. Good house. Price inclusive £275. Good reasons for disposal. Apply, Messrs. LISNEY & Co., King's Cross (adjoining Metropolitan Station).

15 MILES from London.—Totally unopposed good class Retail, Dispensing, and Prescribing BUSINESS, making a net profit of £250 a year, and capable of doing much more by personal attention. Rent £35 Long lease. Price £500, for which there is value in stock and fittings. Strictest investigation. TRAVELLER, Beaulieu Villa, Green Lanes, Finsbury Pk.

WANTED by a chemist, established 33 years in West-end, London, a PARTNER, with £500. Profit of £200 per annum will be guaranteed to the partner. Address OCTAVIUS SMITH, Post Office, Vigo St., London

RETAIL and DISPENSING, in main thoroughfare, N. Would make good nucleus for Medical practice. 11 years' lease at very low rent. Inclusive price £400. Present proprietor 10 years. Apply, Messrs. LISNEY & Co., King's Cross (adjoining Metropolitan Station).

BUSINESSES FOR DISPOSAL.

£1800 capital required to purchase a first-class BUSINESS, purely Dispensing, and being such, the trade is profitable. Situated in a good business street of a seaside town. Principals address, with reference, X. B., care of Messrs. Hearon, Squire & Francis, 5, Coleman St., E.C.

MIDLANDS.—Good class Drug, Patents, and Italian Goods, with DISPENSING, in improving town. Little opposition. Returns £1250 yearly, proof. Nice house and shop, garden, stabling and paddock. Price, valuation only. —Western county. Profitable high class TRADE. £1560 yearly. Net profit £528. Photos. Mr. HINE GILBERT, 70, Loftus Rd., Uxbridge Rd., W.

GENUINE, unopposed Mixed BUSINESS, situated in a large village, eastern counties. Patents full price. Gilbey's agency attached. Profits about £150, and an appointment worth £50 a year. Good shop, plate glass front. Large house, private entrance, garden, warehouse. Rent £24, on lease. Price about £350. CHEMIST, 19, Norfolk St., Leicester.

PLYMOUTH.—Proprietor desires to dispose of his Branch BUSINESS, 94, Treville St. (established 1812). Main thoroughfare and centre of Plymouth. Lease expiring, to be renewed. Incoming small and easy. A bargain to a cash purchaser. F. MAITLAND, 31, Chapel St., Stonehouse, Plymouth.

BUSINESS WANTED.

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N.B.—Postage Stamps cannot be received in payment.

WANTED in a few weeks, a Retail and Dispensing BUSINESS, in a town within moderately easy distance of London preferred. Returns about £700 or £800 a year. Must bear strictest investigation. No agents. Address, M. E., 6, The Grove, Leytonstone, E.

MR. G. B. CROCKER,

Valuer, Transfer Agent & Accountant,

15, WALBROOK, E.C.

NORTH OF ENGLAND.—Retail and DISPENSING, with Wines and Spirits. Returns £1600. Making net profit £500. Price £1000. Part purchase-money may remain. A sound concern.

KENT.—An old established Country BUSINESS. No opposition. Returns £700. £300 net profit. Price about £550. Must be sold in consequence of death.

SURREY.—First-class Retail and DISPENSING. Best position in the town. Returns £1000. Price £650. Worth prompt attention.

LONDON, S.E.—Light Retail and DISPENSING, of a profitable nature. Returns £1150. Price £1000.

LONDON, S.W.—Good class TRADE. Returns £650. Net profit £300. Price £550. Great scope.

LONDON, S.E.—Retail and DISPENSING. Returns £750. Net profit £300. Price only £550. Shop handsomely fitted. Good house and garden.

Valuations for Probate or Transfer conducted in any part of the United Kingdom. Terms on application.

ROCHFORD UNION.

RURAL SANITARY AUTHORITY.

Tenders are invited for the supply of Disinfectants (liquid and in powder), to be delivered from time to time at the Workhouse at Rochford. Tenders to be sent to me, under seal, before 10 a.m. on the 4th September next.

WILLIAM GREGSON, CLERK.

Messrs. BERDOE & CO.

Transfer Agents and Trade Valuers,

30, JEWRY STREET, ALDGATE, CITY.

Established 1870.

KENT COAST.—Very select Retail and Dispensing BUSINESS. Returns average £975. Net profit £400. Rent £60. Good house and garden. Price £750.

OXFORDSHIRE.—Market town. Good class BUSINESS. Returns £700. Net profit £300. Price £400.

MIDLANDS.—Unopposed Mixed BUSINESS. Returning £1300. Good house and garden. Valuation only.

WILTS.—Retail and DISPENSING. Returns £700. Good house and garden. Price £600, or offer.

LONDON, W.—Select neighbourhood. Retail and DISPENSING. Returns £650, by manager. Price £425.

S.E.—Retail and DISPENSING. Returns £950. Owner retiring. Comfortable house. Price £850.

N.E.—Retail and PRESCRIBING. Returns £300, by manager. Price £110 cash. Corner shop.

Others from £100 to £4000, free on application.

12FT. wall-fixture, drawers, lockers, shelving, cupboards, and cornice, £3 10s.; 16ft. wall-fixture, mahogany, silvered plate-glass cupboards between shelving, glass labels and glass knobs to drawers; several others; 9ft. wall-case; a number of solid mahogany-top counters, framed and moulded, pine stained and polished fronts, from 5ft. to 12ft. long, at 6s. per foot run; also a number of black and gold fronted counters, with mahogany tops, at 6s. per foot run; a plate-glass case-fronted counter, 12ft. long, £9 10s.—E. NATALI, 207, Old Street, E.C.

All numbers refer to Maw's Illustrated List.—8ft. wall-case, A 88, £27; upright case, fig. A 4, £5 10s.; plate-glass shelves; show stand, 3ft. 6in. long, 60s.; 14ft. mahogany-fronted counter, £9; 4ft. plate-glass case-fronted ditto, 70s.; 3ft. plate-glass counter-case, A 17, 55s.; 6ft. 9in. long ditto ditto, 20in. wide, £6 10s.; 3ft. bevel-fronted ditto, 35s.; 4ft. plate-glass ditto, as Maw's A 13, 50s.; 5ft. 6in. ditto ditto, 23in. wide, £5 10s.; 5ft. 6in. ditto ditto, as fig. A 3, 60s.—E. NATALI, 207, Old Street, London, E.C.

Plate-glass sponge-cases, fig. A 41, 65s.; ditto, ditto, as fig. A 43, 95s.; show-steps, A 37, 50s., as fig. A 39, 15s.; desk and glass case, A 31, 60s.; a ditto, ditto, 50s.; a number of dispensing screens, from 5ft. to 8ft. long, glass case at each side, with silvered plate-glass in centre and marble slab in front, tablets on top of cases and shelves at back for dispensing bottles, very elaborate, from £6 10s.; a 3ft. ditto, as fig. A 54, 45s.; 3ft. 6in. ditto, 55s.; 4ft. ditto, ditto, 60s.; 4ft. 10in. ditto, 70s.; 5ft., as fig. A 55, 95s.; 6ft. ditto, £5 10s.; 6ft. 6in. ditto, £6; 7ft. ditto, £6 10s.; and a quantity of other screens very cheap; several pair specie jars, royal arms, equal to new, from 24in., price £4; carboys, 16 gallons, with mahogany stands; 3 4-gallon carboys, 10s. each; dome-covered pink ointment jars, gold labelled, any names, 3s. 9d. each; a lot of second-hand green, blue, 3 and 4 lb.; ½-gall. displacement apparatus, fig. 53; black store bottles, with japanned caps, 1s. 3d. each.—E. NATALI, 207, Old Street, London, E.C.

A number of flat glass cases, various sizes, from 2ft. 6in. to 6ft. long, as fig. 2, to open at back, to be sold very cheap to make room; also a number as fig. 3—2ft. long, 30s.; 2ft. 6in. long, 32s.; 2ft. 8in. long, 35s.; 3ft. long, 40s.; 3ft. 6in. long, 45s.; as fig. A 8, 5ft. long, 95s.; 6ft. long, £5 10s.; as fig. A 15, 8ft. long, £7; 5ft. long, £4 10s.; as fig. A 16, 3ft. long, 55s.; 3ft. 6in. long, 60s.; 3ft. 9in. long, 65s.; 4ft. long, 70s.; as fig. A 17, 4ft. long, 75s.; as fig. A 18, 5ft. long, £5; 6ft. long, £5 10s.; tooth brush cases, as fig. A 9, 35s.; as fig. A 10, 50s.—E. NATALI, 207, Old Street, London, E.C.

F. J. BRETT,
VALUER, LEICESTER,
60, ST. STEPHEN'S ROAD.

VALUATIONS.—It is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.

Probate and Fire Insurance valuations.

BANKRUPTS' STOCKS BOUGHT.

CORNWALL.—Unopposed light RETAIL. Agency brings in £20 per annum. Returns £450, increasing. Illness cause of sale. Rent and taxes £25. Price £300.

RAMSGATE.—Dispensing and light RETAIL, in good residential part. Returns £500. Price £350.

KENT.—Light Retail, Dispensing and PRESCRIBING. Returns £700. Good house. Price £600.

YORKSHIRE (close to Sea).—Light Retail and PRESCRIBING, with some Agricultural. Returns over £500. Rent £30. Valuation about £200.

DURHAM Co.—Death vacancy. Good class RETAIL, with Wines and Spirits. Returns £1600. Price to be arranged.

WILTS.—Dispensing, light Retail and PRESCRIBING. Returns £450. Price £450.

SUNDERLAND.—Returns £500. Rent £50. A suitable man can do a large Medicine Chest. Valuation about £500. To an immediate buyer a discount of 20 per cent. will be allowed.

Vendors of good class Concerns can be at once supplied with Partners or Buyers, as F. J. Brett has buyers prepared to invest from £1500 to £3000.

Transfers, Valuations and Auctions conducted throughout the United Kingdom by Mr. BRETT, Leicester.

IMPORTANT.—SALE BY TENDER.

F. J. BRETT, Leicester, is instructed by the owner, Mr. J. ASHER, 15, Market Pl., Driffield, who is retiring, to sell by tender, in one lot, as a going concern, the old established BUSINESS as now and for the last 10 years successfully carried on by Mr. Asher. The business is a good Country Retail, Family, Prescribing, and Agricultural Trade, with Mineral Waters. There are several Proprietary Articles in good local demand. The town is very healthy, and in the centre of one of the best Agricultural districts in Yorkshire. The house and shop are large, with extensive premises. Tenders opened Wednesday, September 19th, 1888. Tender forms and all further particulars can be had of F. J. BRETT, Valuer, 60, St. Stephen's Rd., Leicester.

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8, Stockbridge Terrace, Victoria Station, S.W.

1. YORKSHIRE.	Returns	£1650.	Rent	£75.	Price	£1000.
2. CHESHIRE ...	,,	1300.	,,	55.	,,	700.
3. STAFFORDSHIRE	,,	1200.	,,	60.	,,	1150.
4. KENT ...	,,	1000.	,,	60.	,,	600.
5. KENT COAST	,,	1000.	,,	45.	,,	750.
6. BIRKENHEAD	,,	760.	,,	60.	,,	250.
7. HERTFORDSHIRE	,,	685.	,,	28.	,,	250.
8. LONDON, S.W.	,,	620.	,,	60.	,,	525.
9. SUNDERLAND	,,	500.	,,	50.	,,	400.
10. BIRMINGHAM	,,	500.	,,	40.	,,	300.
11. WEST BROMWICH	,,	400.	,,	50.	,,	250.
12. GUERNSEY ...	,,	385.	,,	40.	,,	300.
13. LEYTONSTONE	,,	240.	,,	40.	,,	225.

Some of above, newly established, increasing rapidly.

FOR SALE.

THE Manufacture of a Special Medicine. Established 40 years and giving good profit. Address by letter, OCTAVIUS SMITH, Post Office, Vigo Street, London, W.

CHEMISTS' TRANSFERS.

32, LUDGATE HILL, LONDON.

MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

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PURCHASERS who desire early information regarding eligible opportunities for entering business will greatly facilitate their object by describing clearly the class of connection they wish to obtain.

N.B.—No Charge to Purchasers.

Messrs. ORRIDGE & CO. are instructed to transfer :—

1. LONDON, S.W.—Good class Retail and Dispensing BUSINESS. Returns under manager about £500 yearly. Capable of great increase. Shop well fitted and good stock, with good house, vinery, &c., attached. Price £500.
2. LONDON, N.W.—Dispensing and RETAIL, with Post Office attached. Well fitted shop, in good position. Returns between £650 and £700 yearly. Good 8-roomed house. Private entrance. Price £500, part of which can be paid by instalments.
3. YORKSHIRE.—Retail, Prescribing and DISPENSING, with profitable Agency attached. Returns last year over £2000, with nearly £500 net profits. Large, handsomely-fitted shop, and good stock. About £1500 required.
4. SURREY.—Pretty locality. Main and Branch BUSINESS for disposal. Business of good class. Retail and Dispensing. Returns over £1200 yearly. Net profits £400. Premises large and convenient. Price £1100.
5. KENT.—Unopposed BUSINESS, of good class. Returns over £700 yearly, with good profits. Rental very low. Business must be sold. Price £475.
6. SOUTH DEVON.—Good town. Old established BUSINESS, Retail, Dispensing and Prescribing. Good position. Returns about £500. Capable of great increase. Good house, &c., attached. Price about £500.
7. HOME COUNTY.—Good town. Retail and Dispensing BUSINESS. Held by vendor several years. Returns last year £835. Well fitted shop and good stock, convenient. Price about £800. Business genuine, and worth attention.

Personal applicants receive Messrs. O. & Co.'s direct attention and advice, where required, free.

VALUATIONS.

Terms for valuation on application.

Appointments by post or wire have immediate attention.

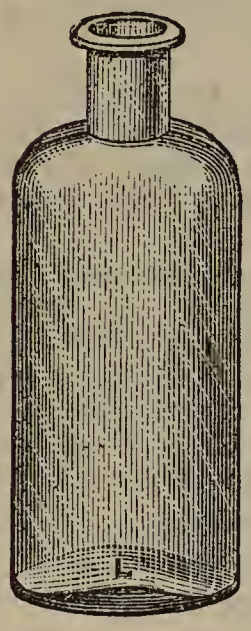
ORRIDGE & CO.

32, Ludgate Hill, E.C.

LYNCH & Co LONDON. TRADE MARK.

DISPENSING BOTTLES

PRIZE MEDAL, SYDNEY, 1879.



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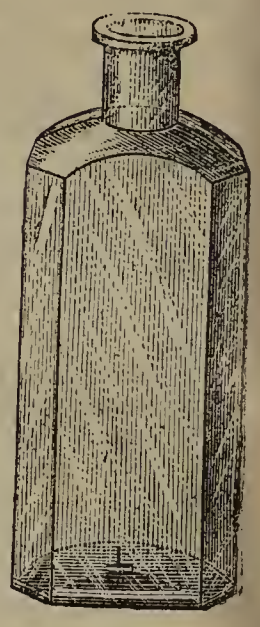
"L" BRAND.



Warranted Finest Quality Metal, Good Mouths, and Correct Measure.

CATALOGUE No. 42a. In any quantity from Stock.

FLATS OR OVALS.

Size ...	1-oz.	1½-oz.	2-oz.	3-oz.	4-oz.	6-oz.	8-oz.	10-oz.	12-oz.	16-oz.	20-oz.	24-oz.	32-oz.	40 oz.
Per Gross	**9/-**	**9/6**	**10/-**	**10/6**	**10/6**	**11/6**	**11/6**	**16/-**	**17/-**	**21/-**	**25/-**	**27/6**	**36/-**	**40/-**

Discount: 10 per cent. Monthly, 5 per cent. Half-yearly.

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The Pharmaceutical Journal AND Transactions.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

SPECIAL NOTICE.

The Society's Libraries and Museums in London and Edinburgh will not be open in the evening during August and September. The Library and Museum in London will be closed during the first fortnight in September.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

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OF THE

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BY PROFESSOR ATTFIELD.

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BY PROFESSOR GREEN.

The Lectures will begin on Friday, October 5th, at 9 a.m., and be continued on the last two days of each week.

MATERIA MEDICA.

Demonstrations will be given by Mr. E. M. Holmes, the Curator of the Museum, on Thursdays, at 10 a.m., commencing on October 4th.

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Lectures and Demonstrations will be given every week by Mr. Joseph Ince, on Tuesdays, Thursdays and Fridays, at 5 p.m., commencing on October 2nd. Laboratory work in Practical Pharmacy will be carried on from 3 to 6 p.m. on Mondays and Wednesdays.

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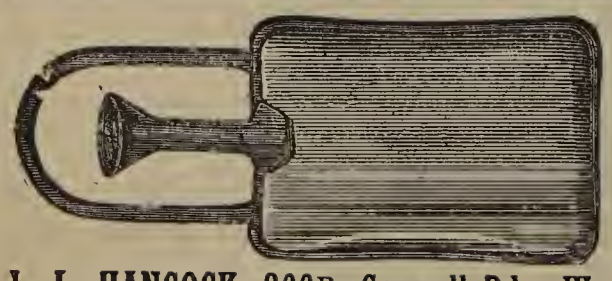

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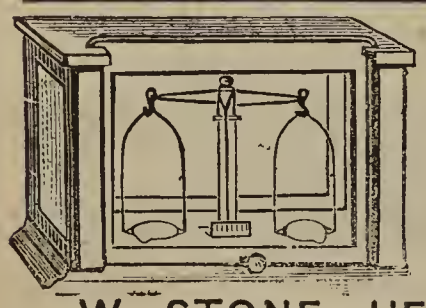

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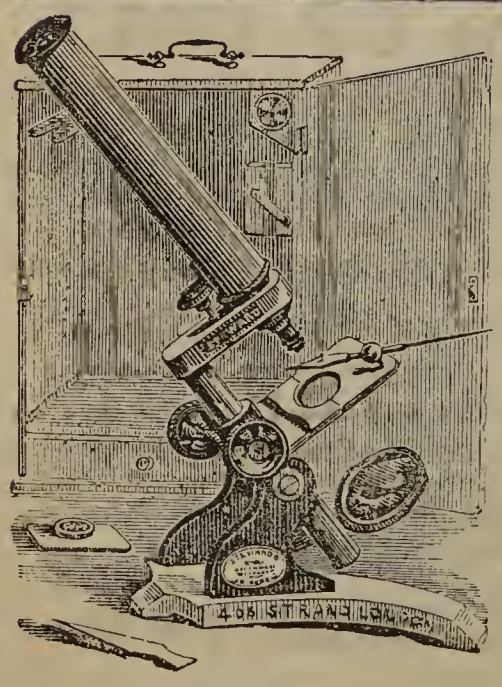

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AMERICAN BAY RUM,

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Retail	**1s. 6d.**	**Wholesale**	**12s. per doz.**
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To Shippers and others requiring it in Bond, M. E. F. will be happy to forward Special Quotations.

WM. COWAN,

INVENTOR & MAKER OF THE VACCINATION SHIELD,

48, DUNDAS STREET, GLASGOW.

DEAR SIR,—I beg to draw your attention to my Vaccination Shield; also to the increasing demand for this article. It has now been ten years before the public, and has found favour. The price, quality, and perfect fit has made it popular both at home and abroad, both for retailer and purchaser.

I would suggest, to keep this article saleable, *as a Shield*, that, when ordering from your Wholesale House, make sure you get Cowan's.

THE PRICES ARE:—

CHILD'S SIZE, 3s. 3d. per Doz ; ADULT'S SIZE, 7s. per Doz.
,, 7s. ,, ,, 11s. ,,
,, 14s. ,, ,, 18s. ,,

Above prices are subject to 15 per cent. discount *for Cash*. If your Wholesale House does not keep them, please send Post Card, and your order will be attended to, and oblige,

Yours truly, WILLIAM COWAN.

IMPROVED SYRINGES

FOR THE

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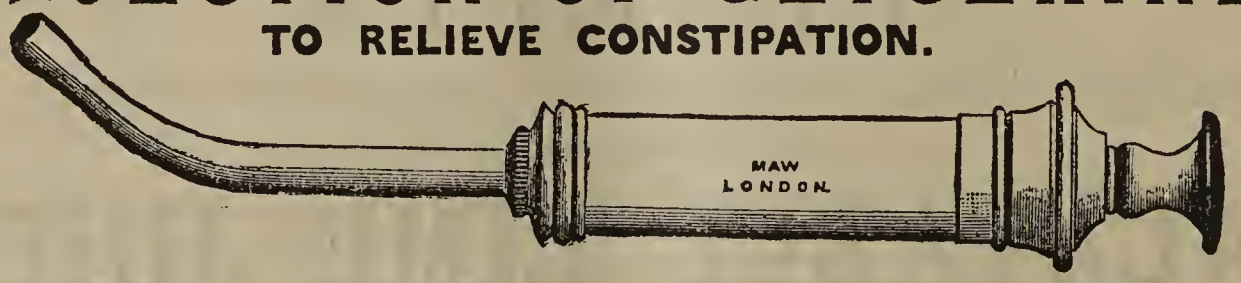
TO RELIEVE CONSTIPATION.



Prices to the Trade: { **PEWTER, 8/- per doz.; PEWTER, with Glass Barrel, 12/- per doz.; VULCANITE, 30/- per doz.; VULCANITE, with Glass Barrel, 30/- per doz.; CELLULOID, with Glass Barrel, 42/- per doz.**

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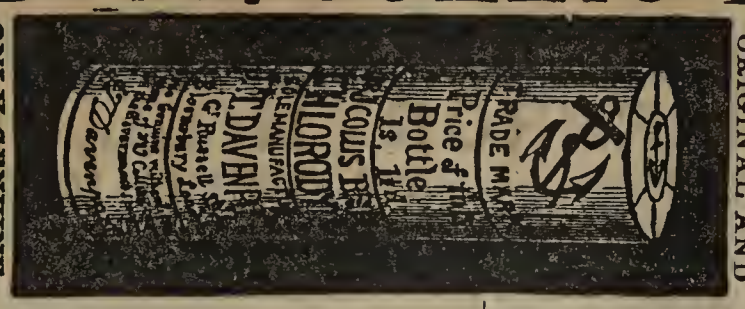
DR. J. COLLIS BROWNE'S CHLORODYNE

ONLY GENUINE. ORIGINAL AND



IS THE GREAT SPECIFIC FOR CHOLERA, DIARRHŒA, DYSENTERY.

COUGHS, COLDS, ASTHMA, BRONCHITIS.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Dr. J. C. BROWNE (late Army Medical Staff) DISCOVERED a REMEDY to denote which he coined the word CHLORODYNE. Dr. Browne is the SOLE INVENTOR, and, as the composition of Chlorodyne cannot possibly be discovered by Analysis (organic substances defying elimination), and since the formula has never been published, it is evident that any statement to the effect that a compound is identical with Dr. Browne's Chlorodyne *must be false*.

This Caution is necessary, as many persons deceive purchasers by false representations.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Vice Chancellor Sir W. PAGE WOOD stated publicly in Court that Dr. J. COLLIS BROWNE was UNDOUBTEDLY the INVENTOR of CHLORODYNE, that the whole story of the defendant Freeman was deliberately untrue, and he regretted to say it had been sworn to.—See *The Times*, July 13th, 1864.

GENERAL BOARD of HEALTH, London, REPORT that it ACTS as a CHARM, one dose generally sufficient.

Dr. GIBBON, Army Medical Staff, Calcutta, states: "2 DOSES COMPLETELY CURED ME of DIARRHŒA."

From SYMES & Co., Pharmaceutical Chemists, Simla. *Jan.* 5, 1880.

To J. T. DAVENPORT, London.

DEAR SIR,—We congratulate you upon the widespread reputation this justly-esteemed medicine has earned for itself all over the East. As a remedy of general utility, we much question whether a better is imported, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances *ad infinitum* of the extraordinary efficacy of DR. COLLIS BROWNE'S CHLORODYNE in Diarrhœa and Dysentery, Spasms, Cramps, Neuralgia, the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than Collis Browne's, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than Collis Browne's is a deliberate breach of faith on the part of the chemist to prescriber and patient alike.—We are, Sir, faithfully yours, SYMES & CO., *Members of the Pharm. Society of Great Britain, His Excellency the Viceroy's Chemists.*

DR. J. COLLIS BROWNE'S CHLORODYNE is the TRUE PALLIATIVE in NEURALGIA, GOUT, CANCER, TOOTHACHE, RHEUMATISM.

DR. J. COLLIS BROWNE'S CHLORODYNE is a liquid medicine which assuages PAIN of EVERY KIND, affords a calm, refreshing sleep WITHOUT HEADACHE, and INVIGORATES the nervous system when exhausted.

DR. J. COLLIS BROWNE'S CHLORODYNE rapidly cuts short all attacks of EPILEPSY, SPASMS, COLIC, PALPITATION, HYSTERIA.

IMPORTANT CAUTION.—The IMMENSE SALE of this REMEDY has given rise to many UNSCRUPULOUS IMITATIONS. Be careful to observe Trade Mark. Of all Chemists. 1s. 1½d., 2s. 9d., and 4s. 6d.

SOLE MANUFACTURER,
J. T. DAVENPORT, 33 Gt. Russell St., W.C.

THE ORIGINAL AND ONLY GENUINE.

IMPORTANT DECISIONS.

Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

FURTHER IMPORTANT NOTICE.

The subjoined list of eminent Firms concur with Vice-Chancellor Sir W. Page Wood's statement in Court that Dr. Collis Browne was undoubtedly the Inventor of Chlorodyne; and that when Chlorodyne, or the Original Chlorodyne, is ordered, they invariably supply Dr. J. Collis Browne's:—

Apothecaries' Hall	London.	Frazer & Green	Glasgow.	Morson, T., & Son	London.
Allen, Hanbury & Co.	,,	Gale & Co.	London.	Newbery & Sons	,,
Baiss Brothers	,,	Giles & Son	Clifton.	Oldham, G., & Co.	Dublin.
Banks & Richards	Birmingham.	Goulding, Messrs.	Cork.	Parsons & Richardson	Leicester.
Barron, Harveys & Co.	London.	Grattan & Co.	Belfast.	Peake, Allen & Co.	Dublin.
Bell, John, & Co.	,,	Grimwade, Ridley	London.	Raimes & Co.	Edinburgh.
Corbyn & Co.	,,	Grindley & Son	Chester.	Sang & Barker	,,
Cox & Gould	,,	Hearon, M'Culloch & Co.	London.	Sanger, J., & Sons	London.
Curling & Co.	,,	Hodgkinson, Tonge & Stead	,,	Sim, James, & Co.	Aberdeen.
Davy, M'Murdo & Co.	,,	Hopkins & Williams	,,	Smeeton, W.	Leeds.
Dobbin, W., & Co., Limited	Belfast.	Hovenden, R., & Sons	,,	Southall & Co.	Birmingham.
Drew, Barron & Co.	London.	Johnson, J. H. & S.	Liverpool.	Sutton, W., & Co.	London.
Drew, B., & Alexander	,,	Langton, W., & Co.	London.	Tomlinson, Hayward & Co.	Lincoln.
Dunn & Company	,,	Lynch & Co.	,,	Treacher, Hodgkinson & Co.	London.
Edwards, W.	,,	Mackay, John, & Co.	Edinburgh.	Westwood & Hopkins	,,
Evans, Lescher & Webb	,,	Mander, Weaver	Wolverhampton.	Woolley, James	Manchester.
Evans, Gadd & Co.	Exeter.	Marsden & Sons	London.	Wyleys & Brown	Coventry.
Ferris & Co.	Bristol.	Maw & Son	,,	Yates & Co.	London
Foulger, S., & Son	London.	Meggeson & Co.	,,		

After these public statements in a Court of Equity, and subsequent confirmation by the trade at large, no Chemist can conscientiously use or sell any other compound for Chlorodyne, without committing a breach of faith, unjust to patient and physician. The *value* of the remedy *alone* creates the great demand.

Sold in Bottles—1s. 1½d., 2s. 9d., 4s. 6d., and 11s. Usual Discount to the Profession.

SOLE MANUFACTURER,

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Manufacturers of Acids, Æthers, Sp. Æther. Nit., Sp. Ammon. Arom., Liq. Ammon., Soldering Solution, &c., and preparations of Alum, Animal Charcoal, Antimony, Baryta, Bismuth, Strontia, Zinc, &c.

CASTLE STREET, SAFFRON HILL, E.C.

Works:—WEST DRAYTON, MIDDLESEX. Telegraphic Address:—"ETHER METHYLATED LONDON."

ACID. ACETIC. B.P., ACID. ACETIC. 0·014. Pure, for Vinegar and Pickles.
PEROXIDE OF HYDROGEN, for Bleaching Feathers, Hair, Silk, Jute, Ivory, Bone, &c.
METHYLATED ETHER, 730 for Refrigerators, 717 for Anæsthesia.
PHOSPHORIC ACID CONCENTRATED, B.P. S.G. 1500, and Syrupy 1750. Guaranteed Pure and Free from Arsenic.
LIQ. FERRI PERCHLOR. FORT., B.P. Free from Arsenic, and Soluble in Spirit.
HYPOPHOSPHITES OF LIME, SODA, &c. CYANIDE OF POTASSIUM.
Ferri et Ammon. Cit., Ferri et Quininæ Cit., B.P., and other Scale Preparations.

DUNN & COMPY., Stirling Chemical Works, WEST HAM, LONDON.

Spiritus Ætheris Nitrosi

Guaranteed to contain the proportion of Nitrous Ether directed by the British Pharmacopœia.

Æther Nitrosus and Sol. Ætheris Nitrosi

Respectively 8 and 4 times the strength of the Spirit.

Spirit. Ammoniæ Aromaticus

Made from Volcanic Ammonia.

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Manufacturing Pharmaceutical Chemists, MANCHESTER.

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WHOLESALE & EXPORT DRUGGISTS,

BUSH LANE, LONDON, E.C.

Telegraphic Address: "NORRAB, LONDON."

Manufacturers of all descriptions of Pharmaceutical Preparations,

Beg to inform Merchants, Shippers, &c., that all Indents entrusted to them will receive careful attention and prompt execution.

Messrs. B., S. & Co. request the attention of their friends and the Trade, at home and abroad, to their having PURCHASED THE BUSINESS of Messrs. JAMES BASS & SONS, Hatton Garden, and with it the various formulæ from which their Special Preparations have been made, and pledge themselves to supply them in all their integrity.

Specimens of these Preparations have remained in the Museum of Kew Gardens during 23 years without deterioration.

THE BEST PEPSIN.

Pepsin in Scales (Fairchild).—This is absolutely free from Starch, Milk Sugar, Acids, Artificial Peptone, or any extraneous substance whatever. One grain of Pepsin (Fairchild) in *Scales* or *Powder* will digest 1,000 grains of albumen. By experience and constant experiment we have steadily refined and improved this product, and now present the peptic ferment in a state of marvellous activity, isolated from all reagents or impurities, and of demonstrated uniformity. We do not attempt to secure profit or cheapness of product by treating the entire stomach, and thus obtaining the admixture of a peptone or any albuminoid that is separable from the peptic ferment.

Pepsin (Fairchild) is supplied in the form of *scales for making solutions* and general manufacturing purposes, in the form of *powder for dispensing*, and in *Tabloids* (1 gr. each) *for easy administration to fastidious patients*. The Fairchild Pepsin is rapidly superseding the ordinary pepsins, many of which are utterly worthless. Fairchild's Pepsin is no more expensive than most of the common pepsins, though it possesses many times the strength and activity.

REDUCED PRICES:

		Retail. Each.	Price to the Trade. Per doz.
Fairchild Pepsin in Scales	¼-oz. bottles	2/0	20/0
,, ,, ,,	1-oz. ,,	6/0	60/0
,, Pepsin Powdered	¼-oz. ,,	2/0	20/0
,, ,, ,,	1-oz. ,,	6/0	60/0
,, Pepsin Tabloids (1 gr.)	25 in bottle	1/6	14/0
,, ,, ,,	100 ,,	4/6	42/0

Discount 10 per cent. to Retail Trade. Special terms in large quantities.

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FLETCHERS' Permanent! CONCENTRATED UNIFORM! ECONOMICAL! LIQUORS.

For the Extemporaneous Production of

TINCTURES, INFUSIONS AND SYRUPS.

"THESE EXCELLENT PREPARATIONS."—*Edinburgh Medical Journal*, August, 1888

"The Drugs used are of the purest quality, and the STRENGTH OF THE FINISHED PRODUCT IS MOST ACCURATELY DETERMINED and brought to the Pharmacopœial Standard."—*Dublin Journal of Medical Science*, June, 1888.

"A distinct novelty . . . manifestly very convenient. We have compared Tinctures, etc., made from these Concentrated Liquors, WITH SIMILAR PREPARATIONS MADE EXACTLY ACCORDING TO THE B. P. METHODS, AND WE FIND THAT THEY ARE PRACTICALLY IDENTICAL IN CHARACTER."—*British Medical Journal*, July 7, 1888.

"These New Liquors have higher claims than for their mere convenience; their POTENCY IS UNQUESTIONABLE, AND THEY PROVIDE THE ELEMENT OF CONSTANCY where that can generally not be ascertained, or even obtained, by the ordinary methods."

The Chemist and Druggist, Dec. 3, 1887.

"We have carefully compared some of the Tinctures and Infusions made from these Liquors with commercial specimens of the same, and can say that, as regards the Tinctures, THE PRODUCTS WERE QUITE EQUAL IN GENERAL CHARACTERISTICS TO THE ARTICLES OF COMMERCE, and the Infusions were, in point of aroma and appearance, EQUAL TO THE FRESH PREPARATIONS AND SUPERIOR TO THE ORDINARY ONE-TO-SEVEN INFUSIONS."—*The British and Colonial Druggist*, May 26, 1888.

Fletcher, Fletcher & Stevenson,

North London Chemical Works, Holloway, London, N.

NEW FORMULÆ FROM THE UNOFFICIAL FORMULARY, B.P.C., 1888.

Acetum Ipecacuanhæ.

Vinegar of Ipecacuanha.

Take of—

Ipecacuanha root, in No. 20 powder	1 oz.
Acetic acid	2 fluid oz.
Distilled water, a sufficient quantity.	

Macerate the powder in 1 ounce of the acid for twenty-four hours, and then pack in a percolator. Mix the remainder of the acid with 10 ounces of distilled water, and percolate with the mixture, continuing the percolation with distilled water until 1 pint of the vinegar is obtained.

Dose.—5 to 40 minims as an expectorant.

Elixir Phosphori.

Elixir of Phosphorus.

Take of—

Compound tincture of phosphorus	4 fluid oz.
Glycerine	16 ,,

Add the tincture to the glycerine, and shake well. This elixir should be preserved from the light. Each fluid drachm contains $\frac{1}{50}$ grain of phosphorus.

Dose.—15 minims to 1 fluid drachm.

Elixir Saccharini.

Elixir of Saccharin.

Take of—

Saccharin*	480 grains.
Bicarbonate of sodium	240 ,,
Rectified spirit	$2\frac{1}{2}$ fluid oz.
Distilled water, a sufficient quantity.	

Rub the saccharin and bicarbonate of sodium in a mortar, with half a pint of distilled water gradually added. When dissolved, add the spirit, filter, and wash the filter with sufficient distilled water to produce 1 pint of elixir.

Each fluid drachm contains 3 grains of saccharin.

Dose.—5 to 20 minims.

Emulsio Olei Morrhuæ, II.

Emulsion of Cod Liver Oil.

Take of—

Cod liver oil	8 fluid oz.
The yolks of 2 eggs.	
Tragacanth, in powder	16 grains
Elixir of saccharin	1 fluid drm.
Simple tincture of benzoin	1 ,,
Spirit of chloroform	4 ,,
Essential oil of bitter almonds†	8 minims.
Distilled water, sufficient to produce	16 fluid oz.

Measure 5 fluid oz. of the distilled water, place the tragacanth in powder in a dry mortar, and triturate with a little of the cod liver oil; then add the yolks of eggs, and stir briskly, adding water as the mixture thickens. When of a suitable consistence, add the remainder of the oil and water alternately, with constant stirring, avoiding frothing. Transfer to a pint bottle, add the elixir of saccharin, tincture of benzoin, spirit of chloroform, and oil of almonds, previously mixed, shake well, and add distilled water, if necessary, to make the product measure 16 fluid oz.

Dose.—2 to 8 fluid drachms.

Extractum Tritici Liquidum.

Liquid Extract of Triticum.

Take of—

Triticum,‡ in No. 20 powder	10 oz.
Rectified spirit, Distilled water	of each, a sufficient quantity.

Moisten the powder with 4 fluid ounces of distilled water, pack in a percolator, and pour boiling distilled water upon it until it is exhausted. Evaporate the percolate to 15 fluid ounces, add to it 5 fluid ounces of rectified spirit, mix, and set aside for forty-eight hours. Then filter the liquid, and add to the filtrate enough of a mixture composed of 3 fluid parts of distilled water and one of rectified spirit to make the liquid extract measure 1 pint.

Dose.—1 to 6 fluid drachms.

Liquor Ferri Hypophosphitis Fortis.

Strong Solution of Hypophosphite of Iron.

Take of—

Sulphate of iron	760 grains.
Hypophosphite of barium	830 ,,
(Containing not less than 95 per cent. of Ba. $2(PH_2O_2)H_2O$.)	
Diluted sulphuric acid	100 minims.
Distilled water	1 pint.

Put the sulphate of iron with 5 fluid ounces of distilled water in a tall 24-oz. bottle, and shake till dissolved. Dissolve the hypophosphite of barium in the remaining 15 fluid ounces of distilled water, and add slowly to the former solution. Shake and add the diluted sulphuric acid; again shake and set aside for two days, then syphon off the clear liquid. Keep it in bottles quite full and in a dark place.

Each fluid drachm contains about 5 grains of hypophosphite of iron. The solution has an acid reaction, and it should not give more than a faint precipitate, if any, with either diluted sulphuric acid, or solution of chloride of barium.

Dose.—10 to 30 minims.

Liquor Hypophosphitum Compositus.

Compound Solution of Hypophosphites.

Syn.—Liquor Ferri Hypophosphitis Compositus.

Take of—

Hypophosphite of calcium	320 grains.
Hypophosphite of sodium	320 ,,
Hypophosphite of magnesium	160 ,,
Strong solution of hypophosphite of iron	6 fluid ounces.
Hypophosphorous acid, 30 p. c.	$\frac{1}{2}$ fluid ounce.
Distilled water, a sufficient quantity.	

Dissolve the hypophosphites of calcium, sodium, and magnesium in 12 fluid ounces of distilled water; add the solution of hypophosphite of iron and the hypophosphorous acid. Filter, and make up to 1 pint by the addition of distilled water.

Each fluid drachm contains about 2 grains each of hypophosphite of sodium and calcium, 1 grain of hypophosphite of magnesium, and $1\frac{1}{2}$ grains of hypophosphite of iron.

Dose.—$\frac{1}{2}$ to 2 fluid drachms.

Syrupus Codeinæ.

Syrup of Codeine.

Take of—

Codeine, in powder	20 grains.
Proof spirit	$1\frac{1}{4}$ fluid oz.
Distilled water	$1\frac{1}{4}$,, ,,
Dissolve and add	
Syrup, sufficient to produce	1 pint

Dose.—$\frac{1}{2}$ to 2 fluid drachms.

Syrupus Ferri Bromidi.

Syrup of Bromide of Iron.

Take of—

Iron wire, free from oxide	$\frac{1}{2}$ oz.
Bromine	533 grains.
Refined sugar	14 oz.
Distilled water, a sufficient quantity.	

Dissolve the sugar in 6 ounces of distilled water, by the heat of a water-bath. Put the iron wire with 4 ounces of distilled water into a glass flask, having a capacity of at least 1 pint, and surround it with cold water. Then add the bromine in successive quanti-

* Benzoyl-sulphonic-imide—a patented preparation.

† The oil distilled from the official bitter almond after the expression of the fixed oil.

‡ The rhizome of *Triticum repens*, Linné, gathered in the spring and deprived of the rootlets.

ties; shake occasionally until the froth becomes white, and the reaction is complete. Filter the solution into the warm syrup, and add, if necessary, distilled water sufficient to produce 1 pint.

Each fluid drachm contains about 4½ grains of bromide of iron.

Dose.—½ to 1 fluid drachm.

Syrupus Ferri Hypophosphitis.

Syrup of Hypophosphite of Iron.

Take of—

Strong solution of hypophosphite of iron	4 fluid oz.
Syrup	16 „

Mix.

Each fluid drachm contains about 1 grain of hypophosphite of iron.

Dose.—½ to 2 fluid drachms.

Syrupus Ferri et Quininæ Hydrobromatum.

Syrup of the Hydrobromates of Iron and Quinine.

Syn.—SYRUPUS FERRI BROMIDI CUM QUININA.

Take of—

Acid hydrobromate of quinine	160 grains.
Diluted hydrobromic acid	1 fluid oz.
Distilled water	1 „

Mix the diluted hydrobromic acid with the distilled water, and in the mixture dissolve the acid hydrobromate of quinine. Then add

Syrup of bromide of iron sufficient to produce	1 pint.

Each fluid drachm contains 1 grain of acid hydrobromate of quinine, and about 4 grains of bromide of iron.

Dose.—½ to 1 fluid drachm.

Syrupus Ferri Quininæ et Strychninæ Hydrobromatum.

Syrup of the Hydrobromates of Iron, Quinine, and Strychnine.

Syn.—SYRUPUS FERRI BROMIDI CUM QUININA ET STRYCHNINA.

Take of—

Strychnine, in powder	2½ grains.
Acid hydrobromate of quinine	160 „
Diluted hydrobromic acid	1 fluid oz.
Distilled water	1 „

Mix the diluted hydrobromic acid with the distilled water, and in the mixture dissolve the strychnine and acid hydrobromate of quinine, by the aid of a gentle heat. Then add

Syrup of bromide of iron, sufficient to produce	1 pint.

Each fluid drachm contains $\frac{1}{64}$ grain of strychnine, 1 grain of acid hydrobromate of quinine, and about 4 grains of bromide of iron.

Dose.—½ to 1 fluid drachm.

Syrupus Hypophosphitum Compositus.

Compound Syrup of Hypophosphites.

Take of—

Quinine (alkaloid)	20 grains.
Strychnine	1 „
Hypophosphorous acid, 30 p. ct.	2 fluid drms.
Strong solution of hypophosphite of iron	3 fluid oz.

Dissolve, and add

Hypophosphite of calcium	80 grains.
Hypophosphite of manganese	40 „
Hypophosphite of potassium	40 „

Dissolve, filter, and add

Syrup sufficient to produce	1 pint.

Mix.

Each fluid drachm contains $\frac{1}{100}$ grain of strychnine and ⅛ grain of quinine.

Dose.—½ to 2 fluid drachms.

Syrupus Ipecacuanhæ Aceticus.

Acetic Syrup of Ipecacuanha.

Take of—

Vinegar of ipecacuanha	1 pint.
Refined sugar	2¼ pounds.

Dissolve by the aid of a gentle heat. Specific gravity about 1·33.

Dose.—¼ to 2 fluid drachms.

Syrupus Pruni Virginianæ.

Syrup of Wild Cherry.

Take of—

Wild cherry bark,* in No. 20 powder	3 oz.
Refined sugar, in coarse powder	15 „
Glycerine	1¼ fluid oz.
Distilled water, a sufficient quantity.	

Tinctura Calendulæ Florum.

Tincture of Marigold Flowers.

Take of—

Marigold flowers,† dried, in No. 20 powder	4 oz.
Proof spirit, a sufficient quantity.	

Moisten the powder with eight fluid ounces of the menstruum, and macerate for twenty-four hours. Then pack in a percolator, and gradually pour proof spirit upon it until 1 pint of tincture is obtained.

Dose.—5 to 20 minims.

Tinctura Capsici Fortior.

Stronger Tincture of Capsicum.

Take of—

Capsicum fruit, in No. 40 powder	10 oz.
Rectified spirit, a sufficient quantity.	

Moisten the powder with a suitable quantity of the menstruum, and macerate for twenty-four hours in a closed vessel. Then pack in a percolator, and gradually pour rectified spirit upon it until 1½ pint of tincture are obtained.

Dose.—1 to 3 minims. Principally used externally.

Tinctura Euonymi.

Tincture of Euonymus.

Take of—

Euonymus bark,‡ in No. 20 powder	4 oz.
Rectified spirit	1 pint.

Moisten the powder with a suitable quantity of the menstruum, and macerate for twenty-four hours; then pack in a percolator, and gradually pour rectified spirit upon it until 1 pint of tincture is obtained.

Dose.—10 to 40 minims.

Tinctura Phosphori Composita.

Compound Tincture of Phosphorus.

Take of—

Phosphorus	12 grains.
Chloroform	2½ fluid oz.

Place in a stoppered bottle, and apply the heat of a water-bath until dissolved. Then add the solution to

Ethylic alcohol	12½ fluid oz.

Shake well. This tincture should be preserved from the light, in accurately-stoppered bottles.

Each fluid drachm contains $\frac{1}{10}$ grain of phosphorus.

Dose.—3 to 12 minims.

Unguentum Oleo-Resinæ Capsici.

Ointment of Oleo-Resin of Capsicum.

Take of—

Oleo-resin of capsicum§	1 oz.
Yellow wax	½ „
Benzoated lard	4 „

Melt the wax and lard at a low temperature, add the oleo-resin, mix thoroughly, and, if necessary, strain through muslin. Stir until cold.

---

* *Prunus serotina*, Ehr. The bark collected in Autumn.

† The florets of *Calendula officinalis*, Linné.

‡ The bark of *Euonymus atropurpureus*, Jacquin.

§ Oleo-resin of Capsicum (United States Pharmacopœia). It is prepared by exhausting capsicum fruit by percolation with ether, distilling off the ether, and pouring the liquid portion of the remainder on a strainer, in order to separate and reject the fatty matter.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 8, 1888.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

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THE BRITISH PHARMACEUTICAL CONFERENCE.

AFTER an interval of twenty-four years the British Pharmaceutical Conference has during the past week revisited Bath. Although this city was not, strictly speaking, the birth-place of the association, for that name applies more correctly to Newcastle-on-Tyne, which is to be visited next year, Bath is the place in which the Conference first met as an organization, in 1864, since which time its roll of membership has increased from one hundred to nearly two thousand names. Such a result, besides being evidence of the fitness of the association for survival, bears unmistakable testimony to the wisdom and energy with which its business has been conducted during the interval, no small portion of the credit for which is due to Mr. F. BADEN BENGER, who for so many years performed the duties of one of its Honorary Secretaries. It was therefore only natural that on the occasion of Mr. BENGER assuming the presidential chair the members should have rallied heartily to his support and secured the success of the meeting. Following the practice of the two previous years, the initial gathering of the members of the Conference took the form of a Conversazione, which was held at the Grand Hotel on Monday evening. This gathering was marked by the attendance of representative pharmacists from all parts of the country, including several of the President's former colleagues on the Board of Examiners.

On Tuesday morning, at ten o'clock, the Conference met for business in the large room at the Grand Hotel. As a preliminary the members had the pleasure of listening to some hearty words of welcome from the Mayor of the city, who expressed his regret that his duties would prevent him from attending the meetings of the Conference or accompanying the members on their excursion to Tintern Abbey. The President gracefully acknowledged this "official" recognition of the Conference, and after the receipt of several letters of regret at inability to attend from a number of old friends of the body had been announced, and a list of the delegates appointed to attend the Conference by various Associations read, the President called upon Mr. NAYLOR, one of the Honorary Secretaries, for the report of the Executive Committee.

Annual Report.

If it be true that a social body is happy in proportion as it remains without a history, the British Pharmaceutical Conference might be considered thrice blessed, since its history, as recorded in the annual reports, has been usually of the briefest and most uneventful nature. From this rule the report presented by the Executive Committee to the Conference on Tuesday last showed no variation. The only subject of an "exceptional" character reported upon was a proposition that members attending the Conference should be furnished with copies of the papers to be read, which the Executive has decided to be impracticable, principally, as it appears, for financial reasons. As this proposition probably arose out of misinterpretation of a courtesy shown by the conductors of this Journal, concerning which an excess of assertion and deficiency of temper has been manifested in a certain quarter, the opportunity may be taken to explain what the practice has really been. For nearly twenty years it has been our custom to provide for the use of the Executive a number of proofs of all the papers sent in by the authors sufficiently early, and for this purpose the manuscripts have been handed over to us as received by the Honorary Secretaries. In addition the proceedings of the Conference have been reported so fully and with such care that it has been possible to reprint the report in the 'Year-Book,' almost, if not quite, without alteration, which has dispensed with the necessity of paying for an official report and reduced the labour of editing that portion of the book to a minimum, so that it has been brought within the powers of the Honorary Secretaries to perform. On the other hand we have retained the proprietorship in our own proofs, and have stipulated that they shall not, without our permission, be used to facilitate prior publication of the papers *in extenso* in other journals. This was only fair to ourselves, as the preparation and publication of such a report requires some little extra time; but as a rule the complete report has appeared in this Journal within five or six weeks,—in fact last year it was completed within the month of September,—a promptitude that compares favourably with similar reports of other associations. Even this delay is rendered nominal rather than real to our readers by a full *résumé* of the papers and proceedings which is supplied to them in the same week as the meeting. This arrangement we believe to be at present at least advantageous to the Conference, an opinion that seems to be endorsed by the decision of the Executive. As soon as it ceases to be considered so, we shall be quite content that it be abolished, leaving us with a free hand to deal with the papers and discussions solely from a journalistic point of view. Other subjects

referred to in the report are certain changes of colonial secretaries, the issue of a new edition of the Unofficial Formulary, and grants in aid of research. In connection with the gift of books provided by the Bell and Hills Fund a difficulty has arisen similar to that which occurred at Southport, consequent upon there being no local pharmaceutical association in existence in Bath to receive the books. They have therefore been presented to the Bath Royal Literary and Scientific Society, subject to the condition that they shall at all reasonable times be accessible to resident pharmacists.

Financial Statement.

It is somewhat difficult to gather from the Financial Statement the exact relative financial position of the Conference as compared with last year; but taking into account only the money assets and liabilities, and ignoring any increase in the stock that may have accrued, there seems to have been a decrease on the credit side of about £27. This would be more than accounted for by the falling off in members' subscriptions received, from £611 13*s.* 9*d.* to £534 13*s.* 6*d.* On the other hand the effect of this falling off has been lessened by a reduction in the cost of the production of the 'Year-Book,' postage, and in other items. The publication of the Unofficial Formulary has also been a source of profit to the Conference. But it is evident the membership is now hardly large enough to provide the means for the present rate of expenditure, and it behoves all those who wish to maintain the Conference in a vigorous condition to do what they can to recover the ground that has been lost during the last two or three years in respect to its numerical strength. The adoption of the Report of the Executive Committee and of the Financial Statement was moved by the President, seconded by Mr. G. S. Taylor, and carried unanimously.

Presidential Address.

The President then proceeded to deliver what proved to be a very long, but very interesting address, the text of which will be found in another part of this Journal. He commenced by humorously describing the meeting as the celebration of "the silver wedding of pharmacy and good fellowship," and after an appropriate eulogium of the late Henry Deane, the first President of the Conference, he referred briefly to the growth of the Conference and some other changes during the twenty-five years that have passed since its formation. The average annual death-rate, he said, had fallen considerably, a fact which pharmacists as scientific men could understand even if the credit for it was mainly due to others. But in the lightening of the "burden of pain" which had taken place during the same time, it was claimed that pharmacists have played an important, if sometimes unrecognized part. The speaker then proceeded to consider the relation of pharmacy to the pharmacist who has adopted the calling as a means of living. It was pointed out that formerly pharmacy was combined with a trade in the preparation and supply of a large number of sundries which has in recent years been diverted to a large extent into other channels, with a corresponding diminution in the pharmacist's means of living. In discussing the question how the loss was to be made good, Mr. Benger uttered some well-merited strictures upon the growing tendency among medical men to delegate their prescribing to manufacturers, and spoke of it as a reproach to pharmacy that so many of the preparations dispensed by medical men, and even prescribed by physicians, or purchased and used by the public on their own responsibility, should be manufactured by persons who possess no legal qualification to practise pharmacy in this country. In fact, he is of opinion that the wholesale manufacturer of medicines should possess the same legal qualifications as the retail pharmacist. Notwithstanding, however, the severe competition, Mr. Benger believes there is remunerative work to be found by the skilled pharmacist who looks for it in the right direction. This would seem, in his opinion, to lie in the tendency to differentiation in pharmaceutical production. "No man will produce "all the preparations he uses or sells, but he may "make most of them, and it is open to him to "endeavour to make a special reputation for "some. If he can succeed in doing anything "better than it has been done before he will "find no difficulty in obtaining better payment "for his work." This argument was the more forcible, since the speaker himself is a notable illustration of the truth of it. The success or failure of the pharmacist of the future will, in Mr. Benger's opinion, largely depend on his fitness to accommodate himself to altered and modified conditions,—among which will be a diminished demand for his services as a mere distributor of medicines,—and his own recognition of the fact that outside pharmacy proper, but nevertheless allied to it, are fields for skill, industry and enterprise in which his technical and scientific knowledge may be profitably utilized. All this led up naturally to a consideration of the important subject of the nature of the early training which shall best equip the pharmacist as a scientific man. In order to throw light upon this Mr. Benger has been in communication with various eminent men as to the conditions of pharmaceutical apprenticeship or pupilage and of the subsequent or qualifying examinations in other countries. In this way he has become possessed of a mass of information upon these points from France, Germany, Austria, Belgium, Italy, Switzerland, Russia, Sweden, Denmark, Holland, the United States, Canada and Australia. One thing that must have struck those who heard the *précis* of this information laid before the Conference, and will strike all those

who read it for themselves, is the almost unbroken uniformity with which in nearly every country evidence is required of an advanced scholastic education as a preliminary to a pharmaceutical career, as well as subsequent systematic training of the pupil in the sciences upon which his calling is based. Those who have objected to the minute dose of curriculum which it is proposed to administer in this country, will find no support in these reports from the experts in the countries mentioned, where the consensus of practice, at least, is in its favour. After pointing out the inferences to be drawn from these reports, Mr. BENGER concluded by urging on all entering the pharmaceutical ranks that they should regard scientific education, not as a troublesome impediment placed in their way by a reckless Parliament prompted by a pedantic society, but as the very key to future success. The address was listened to with interest throughout, and the ripples of laughter that followed the utterance of the quiet bits of humour that occur in it here and there proved that the audience was in continued sympathy with the speaker. At its close, upon the motion of Mr. S. R. ATKINS, seconded by Mr. BOTTLE, Vice-President of the Pharmaceutical Society, and supported by Mr. MARTIN, the Conference awarded to Mr. BENGER an enthusiastic vote of thanks.

Greeting to American Association.

The President mentioned that the American Pharmaceutical Association was simultaneously in session in the city of Detroit, and suggested that the officers of the Conference should be authorized to send to it by cable a fraternal greeting. The suggestion was heartily adopted.

Report of Formulary Committee.

The Conference then proceeded to the reading and discussion of reports and papers, the first taken being the report of the Unofficial Formulary Committee, which was read by the Chairman, Mr. MARTINDALE. This report enumerated briefly the new and modified formulæ that appeared in the proof copies of the edition of the Formulary for 1888, as submitted to the Conference by the Committee. The majority of these formulæ are new and will be found on another page. They include a vinegar of ipecacuanha and a syrup made from it; an elixir and a compound tincture of phosphorus; an elixir of saccharin; a liquid extract of triticum; syrups of codeine, bromide of iron, hydrobromates of iron and quinine, hydrobromates of iron, quinine and strychnine, and wild cherry; tinctures of marigold flowers and euonymus, and a stronger tincture of capsicum, and an ointment of the oleoresin of capsicum. Emulsion of cod liver oil is the subject of an improved formula, in which the yolk of egg is introduced to assist the emulsification. The preparation of tincture of quillaia is incorporated with the preparation of the solution of coal tar, for which it is required. Lastly there is a formula for a "stronger solution of hypophosphite of iron," which has involved corresponding modifications in the formulæ for the hypophosphite preparations. The adoption of this report and the authorization of the issue of a new edition of the Formulary was moved by the President, who referred to the fact that 2250 copies of the first edition had been sold, and that it had been a source of income to the Conference; the motion was seconded by Mr. ROBINSON in very complimentary terms and agreed to unanimously. This was followed by a well-earned vote of thanks to the Unofficial Formulary Committee, and especially to the Chairman, Mr. MARTINDALE, and the Secretary, Mr. NAYLOR, which was heartily accorded on the motion of Mr. PLOWMAN, seconded by Mr. A. H. MASON.

Holmes on Aconite.

Mr. E. M. HOLMES then presented a report on the progress made in the experiment he had undertaken to carry out for the Conference in the cultivation of a definite form of *Aconitum Napellus*, with a view to furnishing suitable material for a more trustworthy chemical investigation of the root than has hitherto been possible. He described three forms that he has selected—from Colchester, St. Neot's, and Riverhead—as approximating in his opinion to typical plants, and recounted the observations made during the cultivation of specimens in his own garden. Some rough experiments, in which the relative activity of the plants was estimated by the intensity of the numbing sensation produced upon the tongue on chewing the seeds, seemed to indicate the desirability that a separate chemical examination of each form should be made. Some interesting information was also given as to the probable yield of root, and the best method of propagation under the conditions of cultivation. The report gave rise to an interesting discussion, in which Professor HILLHOUSE and Messrs. GROVES, RANSOM, PLOWMAN, and GREENISH took part, at the conclusion of which a unanimous vote of thanks was accorded to Mr. HOLMES.

Dott and Stockman on Morphine Derivatives.

After an interval for luncheon, which was served in the Guildhall, a report was presented by Messrs. DOTT and STOCKMAN on the Chemistry and Pharmacology of some Morphine Derivatives, which was a continuation of one presented to the Conference last year. The first paragraph discussed the composition of the compound that was obtained in the artificial production of codeine from morphine, and was first described as dimethylmorphine, the correctness of which name is disputed. Apart from chemical considerations the authors consider that its physiological action is so different from that of methylmorphine or codeine, as to render the constitution represented by that name improbable, and the authors appear to look upon it as methocodeine. They also refer to certain acetyl and benzoyl derivatives, methyl-sulphuric-acid-ether and chlorocodide. The topics of the report were necessarily

somewhat recondite, but testimony to the value of the research as helping to place medicine on a scientific basis was borne by Dr. THRESH and Mr. PLOWMAN. Incidentally Mr. DOTT remarked that the opium alkaloids do not differ from one another in their physiological action so much as is generally supposed, but might be said to form groups differing rather in the intensity than in the quality of their action.

Symes on Extraction by Pressure.

A paper on "Extraction by Pressure," which was next read, was a plea by Dr. SYMES for depending rather upon the operation of pressing than on that of percolation in the extraction of certain drugs. Restoration of moisture to the dry drug and subsequent expression Dr. SYMES considers to be the treatment specially adapted to leaves—of which senna is a type—where there is a bulky material and a danger of injuring the active principle if percolation and evaporation be adopted. The plan recommended for senna is to digest the leaves for from four to six hours in a covered vessel with a mixture of equal parts of rectified spirit and water, in the proportion of a pound of leaves to sixteen fluid ounces of menstruum; afterwards to put the mixture into bags and subject it to pressure of fifty tons or more until it ceases to yield liquid. The marc is then broken up, water added and pressure again applied, until the product amounts to sixteen fluid ounces for each pound of leaves used. In this way, according to Dr. SYMES, a very active preparation can be obtained, and *Convallaria Majalis*, *Damiana* and *Hamamelis* are instanced as suited for treatment upon the same principle. Dr. SYMES's experience in the treatment of senna by pressure rather than by percolation was practically confirmed by Mr. T. B. GROVES and Mr. CONROY, but on the other hand other speakers had more faith in percolation and evaporation at a low temperature.

West on Oil of Cajuput.

In the next paper read, Mr. WEST, Lecturer on Botany and Materia Medica at the Bradford Technical College, reported the results obtained in the examination of fourteen samples of commercial oil of cajuput. The colour of these samples ranged from "pale bluish green," which is the character given in the British Pharmacopœia, to "full bluish green;" the specific gravity at 15·5° C. from 0·9226 to 0·9240; and the boiling-point from 174° to 174·5° C. No difference in odour could be detected between the samples, even on boiling. It would therefore appear that the article at present supplied as cajuput oil is fairly uniform in character. Copper was found in every sample, which agrees with Mr. HISTED's experience in 1872 (*Pharm. Journ.*, [3], ii., 804). Another sample that had been kept in stock for a long time was pale brown and the specific gravity only 0·9194. GUIBOURT says that an oil distilled by himself from *Melaleuca* leaves had a fine green colour; but HISTED says that ordinary cajuput oil after being redistilled is white, though it becomes again green if placed in contact with copper turnings. Mr. WEST incidentally called attention to the fact that for histological purposes this oil is to be preferred to oil of cloves in transferring sections from alcohol to Canada turpentine, as it penetrates more quickly than oil of cloves, and is expelled more readily from the turpentine afterwards.

Conroy on Cotton-Seed Oil in Lard.

The practice of adulterating lard with cotton-seed oil, which appears to have developed recently in the United States to an enormous extent, has rendered very desirable the publication of a good test for the detection of the fraud. In the next paper read, on "Lard: its Adulteration with Cotton-Seed Oil and Detection thereof," Mr. CONROY gave the results of his experiments in this direction. The nitric acid test proposed some years since by Mr. CONROY for the detection of cotton-seed oil in olive oil proved not quite satisfactory when applied to lard, and he prefers a modification of MILLIAU's test, dependent upon the reduction of silver nitrate. This consists in adding twenty grain measures of a test solution, containing five parts of silver nitrate and one part of nitric acid (sp. gr. 1·42) in one hundred parts of rectified spirit, to about one hundred grains of the lard previously melted at a water-bath temperature in a test-tube and keeping the mixture in boiling water for five minutes. Pure lard remains perfectly white, but if adulterated with cotton-seed oil the lard assumes a more or less olive-brown colour according to the amount of the adulterant present, 1 per cent. causing a distinctly perceptible change. The reading of this paper was followed by an animated discussion, in the course of which Mr. W. THOMSON expressed an opinion that whilst freedom from blackening might be accepted as evidence of the absence of cotton-seed oil from a sample of lard, the reduction of silver nitrate was not necessarily evidence of its presence.

This brought the business of Tuesday to an end, and many of the members availed themselves of opportunities afforded them by the courtesy of the authorities for visiting the Abbey Church and the Grand Pump Room and Baths.

The business of the Conference on Wednesday morning commenced with the reading of a paper, by Mr. W. KIRKBY, on Insect Powder.

Kirkby on Insect Powder.

With a view to the detection of the introduction of foreign substances into insect powder the author has submitted the flower heads of authentic specimens of *Chrysanthemum cincrariæfolium*, the reputed source of Dalmatian insect powder, to a microscopical examination with a view to the detection of histological elements characteristic of the species. These he believes he has found in the pollen grains and the

epidermal papillæ of the ligulate florets, of which drawings were shown. The papillæ differ somewhat even from those of the ligulate florets of *C. roseum*, the source of Persian insect powder, and could be used as a means of detecting that admixture. The paper gave rise to a lively discussion, and the necessity for some test for the determination of the purity of this article was evidenced by a statement by Mr. Conroy to the effect that reputed Dalmatian insect powder may be bought at a much lower price per pound than the flowers from which it is supposed to be ground. Mr. Conroy also pointed out that the activity of a sample of insect powder could be readily tested by trying it directly on flies.

Elborne on *Cassia Tora* Seeds.

The results of a "Proximate Analysis of the Seeds of *Cassia Tora*," by Mr. W. Elborne, formed the subject of the next paper. These seeds and the leaves of the same plant are used in India as a remedy for ringworm and other skin diseases, and Dr. Dymock has suggested that they may contain chrysophanic acid. In Mr. Elborne's opinion their medicinal activity is due to a substance which he describes as resembling emodin. From the alcoholic extract he states that he obtained a glucoside, which he calls "potential emodin;" but this view is rather conjectural than the result of satisfactory experiment, and, as pointed out by Mr. Naylor, the subject requires further investigation.

Gerrard on Citrate of Caffeine.

The Solubility of Citrate of Caffeine was the subject of a paper read by Mr. Gerrard, in which he criticised the official description of the drug in the British Pharmacopœia. Having endeavoured to make a ten per cent., solution for convenience in dispensing, he found that out of five samples purchased not one was sufficiently soluble, and none of them corresponded to the official statement that the preparation should form a syrupy solution with a little water. Using a sample prepared by himself Mr. Gerrard met with the same difficulty. His experiments led him to the conclusion that citrate of caffeine has a mean solubility of about 1 in 30. He is therefore of opinion that the statement in the British Pharmacopœia is a mistake that has also found its way into other works.

Moss on Citrate of Caffeine.

In the succeeding paper, by Mr. J. Moss, an instance was given in which an article represented to be "Citrate of Caffeine, Old P.B.," consisted simply of caffeine, without a trace of citric acid. No explanation could be obtained of the designation, and evidently in dispensing such an article as citrate of caffeine, as nearly as possible twice the dose of caffeine intended would be given.

Laboratory Notes by Wright.

The next paper contained a quartet of laboratory notes, by Mr. R. Wright. The first note was on *Acetum Ipecacuanhæ*, and described, apparently, the work that led up to the formula adopted by the Unofficial Formulary Committee. The second was on Liquid Extract of Cascara. In the endeavour to prepare a tasteless extract, it was found that when lime was used a pale coloured extract was produced apparently destitute of any laxative property. But when a mixture of the bark with magnesia was extracted with dilute alcohol, the preparation obtained was free from bitterness, and appeared to act as powerfully as the bitter extract. The next note was on Syrupus Ferri Phosphatis, and described a process for the preparation of an improved syrup containing a smaller proportion of acid and at the same time admitting of dilution without deposit of phosphate. For that purpose, the author recommends to dissolve 360 grains of iron wire in 6 fluid ounces of syrupy phosphoric acid, sp. gr. 1·50, and 9 ounces of distilled water, filtering the solution into 72 fluid ounces of simple syrup and adding water to make up 96 fluid ounces. The last note, on Unguentum Hydrargyri Oxidi Flava, described the results of experiments made to supply the want of an authoritative formula. The B. P. formula for Unguentum Hydrargyri Oxidi Rubri did not give the author a satisfactory product. By melting yellow wax with soft paraffin in the proportion 1 to from 7 to 16 according to the prevailing temperature, a satisfactory ointment may be obtained. The discussion following the reading of this paper turned principally upon the efficacy of the "tasteless" cascara extract, and disclosed the existence of a wide difference of opinion as to the result of treatment of the extract for the removal of bitterness.

Dott and Clark on Compound Syrup of Hypophosphites.

The next paper, by Messrs. Dott and Inglis Clark, on Compound Syrup of the Hypophosphites, gave the results of the examination of four samples, three obtained from commercial sources and one prepared by themselves. Sensible deficiencies in some or all of the constituents were ascertained, justifying the suspicion that this preparation does not always contain all that is represented upon the label.

Moss on Oil of *Mentha arvensis*.

The object of the next paper, by Mr. J. Moss, was to place on record certain characters of oil of *Mentha arvensis* distilled from plants grown in England by himself. The oil was found to have a decidedly yellow colour; the specific gravity at 62° F. was 0·9107; it commenced to boil at 339° F., the temperature rising 402° F. The specific gravity of the redistilled oil was 0·9117.

Ransom on *Cephaëlis Tomentosa*.

Mr. Ransom then read a note on the examination of the root and stem of *Cephaelis tomentosa*, said to be used in Trinidad for the same purposes as the root of *C. Ipecacuanha*, though the root is totally unlike that drug both in external appearance and internal structure. The presence was ascertained of traces

of an alkaloid which gave a reaction with mercuric chloride, resembling that of emetine. But as the physiological action of sixty grains of the root was inappreciable, the amount of alkaloid present must be very small.

Davies on Citrate of Iron and Quinine.

A paper on Citrate of Iron and Quinine, by Mr. R. H. Davies, gave the result of twenty-one experiments undertaken to ascertain the amount and precise nature of the alkaloid present in commercial samples of this preparation. The total alkaloid varied from 11·42 to 19 per cent. Upon the basis of the precipitated tartrates obtained it was inferred that some of these samples contained considerable quantities of amorphous alkaloid, and these were cases in which the preparation had been obtained from foreign sources. In reference to the Pharmacopœia formula, Mr. Davies suggests that the most important conclusion to be drawn from his work is that a preparation containing 16 per cent. of alkaloid cannot be obtained as directed. That point, however, had already been settled by Mr. Fletcher, and it would appear that Mr. Davies is unaware of the fact that the requirement of the British Pharmacopœia has been reduced to 15 per cent. The Conference then adjourned to luncheon, which was again served in the Banqueting Room at the Guildhall.

In the next paper, Mr. N. Asten brought under the notice of the Conference the question recently broached in these columns as to the size of pills containing very small quantities of active medicines, and suggested the desirability of adopting a uniform standard for the sake of obviating inconveniences that now result from such pills being made of different sizes by different dispensers. In the discussion that followed, reference was chiefly made to the weight of the pill, although it is evident that the uniformity to be secured for the satisfaction of patients would apply rather to the size than to the weight. Although no definite decision was arrived at, the preponderance of opinion appeared to be in favour of a minimum size, when possible, of one grain.

Asten on the Size of Pills.

The next paper was by Mr. Hooper, and consisted of a summary of the history of Carthagena bark and of the experiments connected with the introduction of Carthagena bark trees into the Nilghiri Cinchona Plantations of the Madras Presidency. The result of the experiments has been to show that the bark from the plants now being cultivated in the Nilgiris as yielding Carthagena bark is commercially valueless, stem-bark examined from two trees, one five and a half and the other six years old, yielding no quinine and the root-bark only 1·1 per cent.

Hooper on Carthagena Bark.

The next paper on the "Hybridization of Cinchonas," by Mr. D. Hooper, forms an important contribution to the knowledge of the conditions affecting the cultivation of cinchona, and is of a class that can only be contributed by an investigator holding an exceptional position like the Government Quinologist. In the cinchona plantations of the Madras Government there are two well defined species of *Cinchona*,—*C. succirubra* and *C. officinalis*—the bark from the former containing less quinine with more cinchonidine and cinchonine than that from the latter. Between these two species there are also many hybrids, and as the hybrids frequently assume the quicker growing character of the succirubra parent it was interesting to ascertain how far and in what direction the hybridization affected the production of alkaloid. Fifty samples of succirubra bark examined yielded an average of 6·5 per cent. of total alkaloid, and in 100 parts of this the quinine ranged from 17·6 to 26·8 parts, the average being 22·2 parts, whilst the average of the cinchonidine was 36·1 parts. Only five out of the fifty samples failed to comply with the requirements of the British Pharmacopœia for an official bark that it should yield between 5 and 6 per cent. of total alkaloid, not less than half of which shall consist of quinine and cinchonidine. From fifty samples of *C. officinalis* bark the average yield of total alkaloid was 5·25 per cent., but in 100 parts of this the quinine ranged from 48·2 to 62·1 parts, average 55·9 parts, while the cinchonidine only averaged 26·7 parts. The results obtained in analyses of twenty-five hybrid barks showed more total alkaloid with proportions somewhat different from the theoretical quantities calculated for a typical hybrid on the assumption that it would partake equally of the character of the two parents. The quinine ranged from 30·8 to 55·3 per cent. of the total alkaloid, the figures for cinchonidine increasing more or less with the decrease of the quinine, and the two together constituting four-fifths of the whole alkaloid. The highest amount of quinine in the succirubra barks was only equal to the lowest in the hybrid barks, whilst that of the highest of the hybrids merged into the lowest of the official barks.

Hooper on Hybridization of Cinchonas.

This brought the reading of papers to an end, and the next business was the presentation of books provided by the Bell and Hills Fund. In accordance with what has been already mentioned, in the absence of a local association the books were presented to the Bath Royal Literary and Scientific Society, and they were accepted with a hearty acknowledgment by the President of that institution, Mr. Murch, who curiously enough filled the office of Mayor of the city at the time of the previous visit of the Conference in 1864.

The Bell and Hills Gift of Books.

An invitation was then given to the Conference by Mr. Martin and Mr. Clague, speaking in the name of the pharmacists of Newcastle-on-Tyne and district, to visit that city next year. The deputation drew a glowing picture of the allurements presented by the Tyne district, and upon the motion of Dr.

Place of Meeting.

THRESH, seconded by Mr. WOOLLEY, the invitation was cordially accepted.

The Unofficial Formulary Committee was then reappointed, on the motion of the President, seconded by Mr. CONROY, and authority was given to the Committee in cases of emergency to publish formulæ provisionally, provided that they were approved of by seven of its members, such formulæ being subject to revision before formal publication.

Unofficial Formulary Committee.

The Conference then proceeded to the choice of officers for the ensuing year, and on the recommendation of the Executive the following were unanimously elected :—

Election of Officers.

President :—C. Umney.

Vice-Presidents :—M. Carteighe, S. Plowman, C. Symes and N. H. Martin.

Treasurer :—W. Martindale.

Honorary General Secretaries :—J. C. Thresh and W. A. H. Naylor.

Other Members of the Executive Committee :—J. E. Brunker, M. Conroy, R. H. Davies, D. B. Dott, A. W. Gerrard, J. Harrison, T. Maben, B. S. Proctor and F. Ransom.

Local Secretary :—T. M. Clague.

Auditors :—J. Wilson and T. Rheeder.

Votes of thanks were then heartily accorded to Mr. H. HUTTON, of Bath, who had so ably performed the duties of Local Secretary ; to the Mayor and Corporation of Bath, for having lent the Banqueting Hall of the Guildhall for luncheons ; to the Royal Literary and Scientific Society, for having opened its rooms to the members during their stay ; and to Mr. RADWAY for the use of the assembly room at the Grand Pump Room Hotel for the meetings of the Conference. Last, but not least, an enthusiastic vote of thanks was passed to Mr. F. B. BENGER for the able and courteous way in which he had filled the office of President. In acknowledging this compliment, Mr. BENGER said it was probable that one of the results of the visit of the Conference to Bath would be the resuscitation of the local pharmaceutical association, towards which Mr. S. R. ATKINS had promised to assist by the delivery of an address. And thus finished a meeting of the Conference, which if not so largely attended, was equal in other respects to the most successful of its predecessors.

Votes of Thanks.

On Thursday morning the weather seemed to offer little prospect of an enjoyable excursion, but by the time fixed for starting the rain had ceased, and under a bright sky a large number of members and ladies gathered at the railway station whence they were conveyed by a special train to Chepstow. On their arrival the Castle was visited under the guidance of Mr. C. H. CLARKE, who had undertaken to give assistance in that way. At one o'clock the party adjourned to luncheon at the "Beaufort Arms Hotel"; the chair was taken by the President, and before leaving the table he proposed the health of Mr. HUTTON as a recognition of the great services he had rendered in making arrangements for the excursion, as well as in carrying out the other work devolving upon him as Honorary Local Secretary. The drive to Tintern Abbey and the passage of the Wyndcliffe were much enjoyed, and the return journey was made by special train, which brought the party back to Bath almost exactly at the hour which had been fixed.

British Pharmaceutical Conference.

TWENTY-FIFTH ANNUAL MEETING.

The twenty-fifth meeting of the British Pharmaceutical Conference commenced its business on Tuesday, Sept. 4, at the Grand Hotel, Bath, under the Presidency of Mr. F. B. Benger, F.I.C., F.C.S.

WELCOME TO THE CONFERENCE.

His worship the Mayor of Bath (Mr. HAMMOND) opened the proceedings by welcoming the Conference to Bath, which city, he said, was always glad to welcome distinguished visitors. He was very pleased to extend the same welcome to this Conference as was being given to the kindred body, the British Association, though he was sorry to say that his numerous engagements in connection with the visit of that Association would prevent him doing as much as he should otherwise have liked to do in the way of welcoming the Conference. When people were in health they were sometimes too apt to think chiefly of themselves, but "when pain and anguish wring the brow" they were very glad to resort to the medicine man. He understood that this Conference consisted of practical chemists, and it seemed to him that it was working to secure for the public of the country a supply of the purest drugs possible. After the close of the Conference he had no doubt that many people would know a great deal more about drugs than they did at present. Referring to the various objects of interest claiming a visit, the Mayor then mentioned the Abbey, the Victoria Park, with its recently established Botanic Gardens, in behalf of which he asked for contributions, and the baths, a great portion of which had been rebuilt during the last two years, in order to make them complete in every respect, a department for massage being included. If any member of the Conference had friends suffering from rheumatism he was sure they would be inclined, after making full inquiries and inspection, to recommend them to try the Bath thermal waters. He concluded by referring to the paper to be read by Mr. Conroy on the adulteration of lard, which he said would be welcomed by the Sanitary Committees of that city and many others, which had these matters constantly coming before them.

The PRESIDENT expressed on his own behalf and that of the members of the Conference their high appreciation of the kindness and courtesy which had prompted the Mayor of Bath to meet them that morning with such a cordial welcome. He thanked him also for the official recognition of the Conference, and through it of pharmacy which was afforded by his presence, and he would add to his thanks to the Mayor personally a hearty wish for the continued and increasing prosperity of the beautiful city over which he presided.

The PRESIDENT then announced that a communication had been received from the Bath Royal Literary and Scientific Institute, saying that all members of the Conference would be considered as members of the Institute during their visit.

Letters of Apology.

Dr. THRESH (Hon. Sec.) said letters of apology had been received from Dr. Brady, F.R.S., Professor Attfield, F.R.S., Professor Bentley, Mr. John Williams, Mr. Richard Reynolds, Mr. Carteighe, Mr. Umney, Mr. Stephenson, Edinburgh, Mr. Newsholme, Sheffield, and others all regretting their inability to be present.

Reception of Delegates.

The following list of delegates was read by Dr. Thresh :—

Pharmaceutical Society of Great Britain.—The President, Vice-President, Treasurer and Messrs. Atkins,

Butt, Cross, Evans, Gostling, Greenish, Martin, Newsholme, Symes, and the Editor, Sub-Editor and Secretary.

Pharmaceutical Society of Great Britain (North British Branch).—Messrs. D. B. Dott, J. H. Fisher, Alexander Kinninmont, and J. Nesbit.

Pharmaceutical Society of Ireland.—Mr. G. D. Beggs.

Brighton Association of Pharmacy.—Messrs. Marshall Leigh and W. D. Savage.

Dover Chemists' Association.—Mr. Alexander Bottle.

Hastings Chemists' Association.—Messrs. Hasselby and Rossiter.

Hull Chemists' Association.—Messrs. C. B. Bell and W. H. Hammond.

Leicester and Leicestershire Chemists' Association.—Messrs. S. F. Burford, J. W. Clark and J. H. Shepherd.

Liverpool Chemists' Association.—Messrs. John Bain, M. Conroy, A. H. Samuel, C. Symes and W. Wellings.

Manchester Chemists' Association.—Messrs. F. B. Benger, G. S. Woolley and W. Elborne.

London Chemists' Assistants' Association.—Messrs. W. R. Dodd, T. S. Dymond, H. H. Millhouse, and C. I. Stertner.

North of England Pharmaceutical Association.—Messrs. J. Brayshay, T. M. Clague, John Harrison and N. H. Martin.

Sunderland Chemists' Association.—Mr. J. Harrison.

Midland Counties Chemists' Association.—Mr. Berry (President), and Messrs. Charles Thompson, Alcock, and Thomas Barclay.

FINANCIAL STATEMENT FOR THE YEAR ENDING JUNE 30, 1888.

THE HON. TREASURER IN ACCOUNT WITH THE BRITISH PHARMACEUTICAL CONFERENCE.

July 1, 1887. *Dr.*	£ s. d.	£ s. d.
To Assets forward from last year—		
,, Balance in hand at Bank		63 14 8
,, Cash in Secretary's hands	4 0 9	
	3 2 0	
		7 2 9
,, Messrs. Churchill's Account		108 17 5
June 30, 1888.		
To Sale of Year-Book by Publishers		20 0 0
,, Advertisements, 1887 volume	119 1 9	
,, ,, 1886 ,,	5 13 0	
		124 14 9
,, Members' Subscriptions		534 13 6
,, Index to Year-Book, sale by Secretary	1 17 6	
,, Index to Year-Book, sale by Publishers	0 2 4	
		1 19 10
,, Outstanding Liabilities, Messrs. Butler and Tanner	131 11 4	
,, Messrs. McCorquodale and Co.	7 6 6	
		138 17 10
,, Unofficial Formulary, sale by Publishers		54 9 0
,, ,, ,, Secretary		0 2 6
		£1054 12 3

June 30, 1888. *Cr.*	£ s. d.	£ s. d.
By Expenses connected with the Year-Book:—		
Printing, Binding and Publishing, etc.	360 8 10	
Postages and Distributing	41 4 10	
Advertising and Publishers' charges	34 8 8	
Editor's Salary	150 0 0	
Foreign Journals for Editor	5 15 6	
		591 17 10
,, Unofficial Formulary:—		
Printing	20 19 0	
Advertising	5 7 6	
Publisher's Commission, etc.	5 9 0	
		31 15 6
,, Secretary's Salary to date	48 8 10	
,, Rent of Office	8 2 7	
		56 11 5
,, Blue Lists:—		
Printing	5 15 0	
Postages	5 0 0	
		10 15 0
,, Printing and Stationery		32 10 6
,, Postages		29 0 9
,, Bank Charges		0 1 7
,, Petty Cash		5 15 0
,, Grants (for research)		7 0 0
,, Liabilities of last year, since paid—		
Richardson	11 5 6	
McCorquodale	16 8 6	
		27 14 0
,, Outstanding Assets—Messrs. Churchill's Account		154 0 11
,, Balance at Bank	105 0 3	
,, Balance in Secretary's hands	2 9 6	
		107 9 9
		£1054 12 3

THE BELL AND HILLS FUND.

1887.		£ s. d.	£ s. d.
July 1.	Balance on hand	21 14 4	
,, 6.	Dividend on Consols, £350	5 1 6	
1888.			
February 14.	,, ,,	5 2 0	
			31 17 10
1887.	By Purchase of Books for Manchester, from H. Kimpton		10 16 6
			£21 1 4
Assets—			
Cash—Balance at Bank			21 1 4
Consols			350 0 0

Audited and found correct. Security (Consols £350) viewed.

August 18, 1888. W. WILKINSON, Manchester.
,, 22, 1888. J. WILSON, Bath. } *Auditors.*

ANNUAL REPORT.

The following report of the Executive Committee and also the Financial Statements were read by Mr. W. A. H. NAYLOR (Hon. Sec.):—

Report of the Executive Committee.

Of the business which has been transacted by your Committee during the past twelve months, the greater portion has necessarily consisted of a series of duties similar to those which it has in previous years been called upon to discharge. There has, however, been one subject of exceptional character which has engaged the attention of your Committee and which has demanded and received its most careful consideration. The reference is to a communication received in October last, from Mr. S. F. Burford, of Leicester, in which he represented that a great boon would in his opinion be conferred upon the members attending the Conference if they could at the time be furnished with copies of the papers to be read, or with abstracts of such papers. It was suggested that by the adoption of this course better discussion would be ensured. After the fullest deliberation, your Committee was decidedly of opinion that the suggestion was not only impracticable, but that the Conference would not be justified in initiating a departure which would of necessity put a severe strain

upon its finances. This conclusion was embodied in the following resolution, which was unanimously passed:—

"That this Committee having fully considered the proposal to supply proof copies of author's papers to members present at the Annual Meeting of the Conference, decides that it is altogether impracticable."

It is a source of gratification to your Committee to be able to announce that Mr. H. Shillinglaw has been re-appointed Colonial Secretary for Victoria; a post which he felt it incumbent upon him to resign a year ago.

On the recommendation of the late Secretary for New South Wales, Mr. Sadler, President of the Pharmaceutical Society of that colony, has undertaken the secretarial duties previously discharged by Mr. Ryder Horton. The Conference will learn with regret that Mr. A. H. Mason, F.C.S., has resigned his position as Colonial Secretary for Canada, a step which has been necessitated by his return to this country. It is, however, confidently hoped that the loss of Mr. Mason's services to Canadian pharmacy will result in a corresponding gain to British pharmacy.

Your Committee has, during the year, had the pleasure of handing over to Mr. D. B. Dott, F.R.S.E., a sum of £5 to be expended in the purchase of materials for conducting, in conjunction with Dr. Stockman, an investigation upon Morphine Derivatives. A report, embodying the results of their researches, will be presented to this meeting. Mr. E. M. Holmes, F.L.S., will also give some account of his experiments in connection with the cultivation of authentic specimens of *Aconitum Napellus*, for the prosecution of which he received a money grant last year.

In consequence of the non-existence at Bath of a Pharmaceutical Association, some difficulty has arisen in connection with the bestowal of the books provided through the liberality of Mr. Thomas Hyde Hills, by the Bell and Hill Fund, together with a copy of the 'Science Papers' and 'Pharmacographia,' given by Mr. Thomas Hanbury. Following in the main the precedent created in the case of Southport, arrangements have been made for the presentation of the volumes to the Royal Literary and Scientific Society of the city, subject to the condition that they shall at all reasonable times be accessible to the resident pharmacists.

The Committee of the Unofficial Formulary has through its Chairman submitted to the Executive Committee a draft of the 1888 issue in the form in which it recommends that it should be published.

Your Committee has pleasure in stating that the sale of the Unofficial Formulary has been very satisfactory, and the financial result to the Conference is highly gratifying.

The Conversazione and Reception by the President and Officers of the Conference, which has been held on two previous occasions, was repeated last night, and again proved an unqualified success. Evidence of the utility of such an institution has been supplied by each successive gathering, and there being no reasonable doubt but that the need for its existence will be recurrent there is warrantable ground for regarding it as a permanent feature of the Conference.

Mr. Siebold, F.I.C., F.C.S., was last December reappointed Editor of the 'Year-Book,' and the manuscript, as far as it can be prepared, is now in the hands of the printers.

Mr. J. Wilson (Bath), one of the auditors, said he had carefully examined the accounts and seen the securities, which he found in every way satisfactory.

The President moved that the report of the Committee and the Financial Statements be accepted, and remarked on the satisfactory fact that the Unofficial Formulary had not only been found to meet a widespread want, but had been an actual source of profit to the Conference.

Mr. Taylor (London) seconded the motion, which was carried unanimously.

The President then delivered the following address:—

The President's Address.

Ladies and Gentlemen,—We celebrate to-day the silver wedding of pharmacy and good fellowship. On September 2, 1863, twenty-five years ago, the inaugural meeting of the British Pharmaceutical Conference took place at Newcastle-on-Tyne, and a year later the first annual meeting was held in this city under the presidency of the late Henry Deane. No eulogium on my part is needed to keep his memory green in the hearts of those amongst us who knew him; the mere mention of his name calls up for us a vision of kindliness and wisdom. But standing as I unworthily do in his place, it is fitting I should tell younger members that Henry Deane was prominent amongst those who twenty-five years ago sowed the seed—a veritable mustard seed—which has grown into the widely branching British Pharmaceutical Conference of to-day. At Bath in 1864 our membership roll was a little over a hundred. At Bath in 1888 we have nearly three times that number of foreign and colonial members alone, and our total roll, though smaller than in some former years, approaches 2000 names.

It is unnecessary that I should detail the scientific work done by the Conference,—is it not written in the goodly row of 'Year-Books' which adorn our shelves? But I may mention that its members have contributed upwards of 500 papers to the annual meetings, whilst a glance at the list of visitors in recent years will show how widely the opportunities for discussing such communications, and for friendly intercourse amongst pharmacists are recognized and valued. There is scarcely any part of the United Kingdom which does not supply its contingent. We began with a little party of 21 at Newcastle in 1863, and we were 250 at Manchester last year.

The quarter of a century comprised in the life of the Conference has been fruitful, perhaps beyond precedent, in the beneficent results of applied science. So wide and rapid has been the development of the scientific spirit that it pervades every department of human knowledge.

One striking result is the improved condition of public health. The average annual death-rate, which in nine of the largest cities and towns of England for the ten years from 1865 to 1875 was 27·8 per thousand, fell in the succeeding ten years to 24·2, and, if we take the last ten years of the interval to 21·5. It has been estimated that upwards of 247,000 persons now living would have been dead had the earlier death-rate been maintained. According to Sir Spencer Wells, the average duration of human life in this country has increased from thirty to forty-nine years during the last half century, and much of this increase has taken place within the shorter period under consideration. Now although we, as pharmacists, or as a conference, can claim but little credit in connection with these important facts, we are, as scientific men, at least able to understand them. We at least know that they are due to the scientific study of diseases, their origin, nature, modes of propagation, etc., to the wise

application of sanitary laws based on the teaching of science, and to the diffusion of knowledge of the natural laws of health amongst the masses. But if we extend our view of the benefits conferred by science on suffering humanity a little further, and endeavour to realize the extent to which the burden of pain in the world has been lightened, we find that the chemist, and in some degree the pharmacist, has played an important, if sometimes unrecognized, part in the work.

Some of my predecessors in this chair have in past years laid before us the relation of pharmacy to the State, to medicine, etc. We may perhaps for a few moments this morning consider first the relation of pharmacy to pharmacists, to ourselves; and then, as far as time will permit, the education and training most likely to improve this relationship.

In the first place, pharmacy has been adopted by most, perhaps by all of us, as a means of living,—though some of us may have come to take pleasure in it for its own sake,—and I ask you to descend with me for once to the low and commonplace standpoint whence we may again regard it in its original light.

Pharmacy, in the strict dictionary definition of the word—the preparation of medicines—has, however, not been the sole, nor often the chief source of income of the British pharmacist.

The practice of pharmacy has formed a centre round which a business in certain sundries, varying with the requirements of the period or district, seemed naturally to grow up. The production of some of these in their best forms demands a skill very nearly allied to, and scarcely inferior, to that required in the preparation of medicines, whilst the sale of others with less obvious relationship to pharmacy has for so many years been associated with it that a connection appeared to have been formed by long usage. To some extent, however, in all districts, and to a very great extent in others, pharmacy has of late been stripped of this associated trade. I will not weary you by discussing at length how this has come about. The causes are not far to seek, and are sufficiently obvious. Businesses of all kinds have become less distinct and definite, shops are being replaced by stores, individual proprietors by limited companies, striving to make their price lists as comprehensive as possible, one "universal provider" taking the place of a hundred or perhaps a thousand businesses of a dozen denominations. Capitalists, unwilling it may be that their names should appear in trade directories, are nevertheless willing to engage *incognito* as shareholders in businesses of which they are wholly ignorant if they can get 5 per cent. for their investment, whilst the public with whom price, cost, has come to stand before quality, for the simple reason that they can understand and appreciate the one, but in many cases are quite incompetent to judge of the other, have supported these undertakings, content, nay jubilant, if they can save ten per cent. in an annual expenditure on chemists' wares of five or ten pounds. All this has affected very seriously our means of living.

What then is the remedy? Either we must get more pharmacy, we must regain our lost trade, or we must replace it with some other remunerative occupation.

There appears to be no immediate prospect of any considerable transference of dispensing from medical men to pharmacists. The medical profession is becoming more and more crowded with men who have to live by it, or at least to try to do so, and a bottle of medicine thrown in with their advice doubtless adds to the pecuniary value of the latter in the eyes of a large proportion of their patients. Elegant pharmacy, so-called, is responsible for a good deal of this. In olden times dispensing was more or less disagreeable work. Pill mixing and rolling was a duty entrusted to the surgeon's apprentice or pupil; now, since medical apprentices have ceased to be, dispensing by medical men themselves has been simplified, promoted, and encouraged by the introduction of pearl coated pills, delicately flavoured syrups, etc., which can be dispensed in a moment. These are sure to please the patient, and if they do not cure him, he may possibly recover during their use, and give them and the doctor the credit.

So it has come about that, whilst a large number of medical men dispense their own medicines, very few—scarcely any—make their own preparations. Buying their galenicals ready made, many know little or nothing of pharmacy; some, indeed, as pointed out by Mr. Greenish from this chair two years ago appear to be willing to delegate prescribing, and to accept, on the recommendation of enterprising manufacturers, compound remedies, the proportions, and often the very names of the active ingredients in which, are withheld. In such cases the manufacturer becomes virtually the prescriber, the medical man merely the dispenser, and the qualified English pharmacist is out of it altogether. Is it not a reproach to pharmacy that so many of the preparations dispensed by medical men, and even prescribed by physicians, or purchased and used by the public on their own responsibility, should be manufactured by persons who possess no legal qualification to practise pharmacy in this country?

We all know that Parliament has in its wisdom decreed that only the retail pharmacist needs a legal qualification, to be acquired after passing examinations which include a knowledge of raw drugs, their sources, varieties, adulterations, etc., whilst the man who is, or calls himself, a wholesale manufacturer of medicinal agents is subject to no control. As a result, medical men are constantly called on by plausible adventurers or their agents, who "talk up" the wonderful virtues of their specialities, some of them even going so far as to assume the gratuitous instruction of the medical profession in the treatment of particular diseases.

In my opinion the wholesale manufacturer should possess the same legal qualification as the retail pharmacist, or, to put it another way, it is the qualified pharmacist only who should be the producer of pharmaceutical preparations, whether supplied direct to the public or through medical men.

I consider that those members of the medical profession who,—necessarily ignorant of the quality of many of the galenicals they prescribe,—ignore or neglect the obvious safeguard and guarantee afforded by the qualification of the maker, fail in their duty towards their patients. We pharmacists might, with as much show of reason, recommend the unqualified and unregistered medical quack, when asked, as we so

frequently are, to advise as to the choice of a physician.

In the future, as in the past, there will doubtless be a certain amount of differentiation in pharmaceutical production; no man will produce all the preparations he uses or sells, but he may make most of them, and it is open to him to endeavour to obtain a special reputation for some. The field for pharmaceutical research is by no means exhausted. Of late years new drugs have monopolized a large share of attention, to the partial exclusion of older ones; but there is much original work still to be done on many of the latter, and since we are regarding the matter to-day entirely from the point of view of the pharmacist with a living to make, I will add remunerative work. In connection with this subject it will be well to bear in mind that elegance is not invariably associated with vigour, even in a pharmaceutical preparation. There is some temptation to aim chiefly at making things pleasant to the eye and palate. The true pharmacist will, however, never forget that his products must be potent as well as palatable, that indestructibility is not a desirable quality in a pill, be that pill never so tasteless.

He who selects a particular drug or class of drugs for investigation, and repeats, to begin with, the published experiments of others, very probably detects some flaws either in the methods employed or in the conclusions arrived at. Pursuing his enquiry, he soon finds himself in the fascinating region of the unknown. Where every path is untried there is always the possibility that one may lead to the discovery of a new fact; it may be but a trifling addition to our knowledge—it may be of unsuspected importance—who shall say? In any case he can hardly fail to invigorate his mind by such an excursion, and be better fitted to undertake another. Endowed with an "intellectual interest in his work" he will certainly derive a good deal of pleasure from its performance. Should he succeed in producing a new or improved preparation he has still to find or make a market for his productions. It will be necessary for him to adopt some means of introducing them to the notice of those who will use them, and he can do this without sacrificing one whit of his honour, or tarnishing by the faintest streak his good name. As a high-minded man he will of course say no word of them by mouth or printer which he does not know to be strictly true. It matters little whether he keep his processes secret or not. It is the constant study of details, the accumulated experience of many days, which enable a man to build up a reputation, and one thus securely built will stand a good deal of battering from without. There may come a critical time when the productive capacities of his back shop or laboratory are found insufficient, and a larger building with more adequate appliances become necessary. At once his preparations are open to the reproach of being "factory made." If this is the worst that can be said of them, however, they will probably survive.

Such a possible development of any department of his business is a perfectly fair and honourable one for the pharmacist to aim at, and one worthy of his ambition. If he can succeed in doing anything better than it has been done before, he will find no difficulty in obtaining better payment for his work.

Dr. Squibb, of New York, in the last number of his 'Ephemeris' (June, 1888), remarks on the fact that the important class of fluid extracts was originated by William Proctor, jun., of Philadelphia, and adds, "he was throughout his fruitful life a dispensing pharmacist; and he earned first by faithful ability, and then commanded, prices for his preparations which were liberally remunerative."

I am aware that there are not wanting indications that the unbounded faith in physic which has long dwelt in the human breast is waning, at least amongst the more educated classes; some even of our leading medical men, who do not dispense their own medicines, have begun to talk of the uselessness of drugs. The truth of the axiom, "Prevention is better than cure," is not only admitted, but acted on. Increasing attention is being paid to hygiene, sanitation, diet—matters outside physic, but relating to health. The pharmacist may however often render as valuable services in providing the means of prevention as in the production of remedies.

There are few callings which have more far reaching affinities than that of the pharmacist. It has sometimes been said that his training and daily work have a tendency to narrow his views and dwarf his mind. I differ entirely with this opinion. A well trained pharmacist has many strings to his bow. His acquired habits of minute observation, absolute accuracy, and careful attention to details, should be invaluable to him. As a business man he learns much which the pure scientist often lacks, whilst as a scientific man he possesses knowledge beyond that of most of his business competitors. His daily work brings him in contact with many sorts and conditions of men, and he has special opportunities of learning much of the everyday requirements of his fellow creatures; but I fear as a class we have been a little deficient in self-reliance, too apt to look for, and depend on, outside help, the protection of some hypothetical Act of Parliament, the tender care of this Society or that. It is time we made a fuller and more extended application of that scientific knowledge, the possession of which we sometimes assure the world is our special characteristic.

If some of the trade formerly associated with pharmacy has been alienated, the field for the practical application of science has enormously increased. The pharmacist must fit himself to occupy part of that field. If he will trust more to the scientific side of his vocation, there is room for him yet.

Briefly, we may, I think, rest assured that the success or failure of the pharmacist of the future will largely depend on his fitness to accommodate himself to somewhat altered and modified conditions, that amongst these modifications will be a diminished demand for his services as a mere distributor of miscellaneous sundries, and that, so far as the art of pharmacy is concerned, more scientific and technical training will be necessary. His success will largely depend too, on his recognition of the fact, that outside pharmacy proper, but allied to it by family ties, as it were, are fields for skill, industry and enterprise in which his technical and scientific knowledge may be profitably employed.

The pharmacist should need no reminding that

chemistry has very important bearings on the production of innumerable articles in domestic use besides medicines; further, that the manufacture of many of these is in the hands of unscientific men, and that the processes employed in their production have not yet been worked out on scientific principles. Who so fit as the pharmacist is, or ought to be, to take up the study of some of these? A very slight improvement in any one in common use may turn the stream of prosperity in his direction. It is scarcely possible that a knowledge of recently discovered chemical reactions and processes, and of the constantly increasing number of new chemical bodies which are placed at our disposal, should not afford the means of such improvement to the industrious and intelligent worker.

But his work must be real, and he must have something more than a label to show for it.

I lately read on one of these—it was not used by a member of this Conference—that the preparation upon which it was placed was "the result of a long period of careful study and research." This "result" was further described as "a new and matchless remedy for baldness, and a never failing producer of whiskers and moustaches." Men who are guilty of falsehoods such as these degrade the art and science of pharmacy, hinder its progress, and do their best to bring contempt and ridicule on those who practice it, besides stamping themselves as quacks and charlatans.

One is sometimes reminded in these announcements of Captain Wragge in "No Name," who at one period of his career was occupied in "imitating the vintage processes of nature in a back kitchen at Brompton, where he produced a sherry, pale and curious, tonic in character, round in the mouth, a favourite at the court of Spain, at 19*s.* 6*d.* per dozen, bottles included."

We have been told from our youth up that "knowledge is power." Doubtless, but it is latent power, and unless we convert it into some active form, it will not greatly improve our condition, or that of the rest of mankind. Had Swan, himself a pharmacist, and a member of this Conference, pursued his study of electricity no further than is necessary in order to pass the examinations of the Pharmaceutical Society, or had he at a later date hidden his light under a bushel, we should not have had the Swan incandescent lamp, nor Swan the fortune it brought him.

Even to take advantage of the researches of others, to convert theory into practice, to discover the latent elements of practical application in the bare philosophical announcements of the pure scientist, demand mental qualities which are a product of training and education.

But whether the pharmacist of the future confine himself to the preparation and distribution of medicinal agents, or widen his field of labour in some of the many directions open to him—one thing is certain, he must keep step in the march of progress. The general and technical education which was enough for our fathers was found to be insufficient for us, and already it is evident that our sons must be better equipped than we are to make and maintain a position in the future. From the class below us in the social scale a process of natural selection is sending up youths who will be formidable opponents to those of gentler birth, when they meet a few years hence in the struggle for remunerative employment. On all sides foreigners are taking the field against us and are invading our very thresholds. Those engaged in almost every scientific industry have seen this danger and are making efforts to avert the catastrophe. Better and broader education, more technical skill and training, more self-denial and self-reliance are found to be necessary. Shall we pharmacists be the last to recognize the fact that our own shortcomings are one cause of the prevailing depression in our ranks? There is good reason for the interest lately shown in the question of apprenticeship and early training of pharmacists. We may well ask ourselves whether our present system is well adapted to furnish those who are hurrying into our business in such vast numbers with the means of earning that amount of remuneration without which it is impossible to be happy, to do our duty to ourselves, to our families, or to our calling, or to be respected and influential citizens of the State, and whether we adopt adequate means of sifting out by our Preliminary examination those who are not sufficiently educated to have a reasonable hope of a successful career.

Our present system of apprenticeship is a survival from the time when it was possible for the whole art and mystery of our vocation to be learnt in a shop. His daily round of duties brought the youth into contact with all it was then necessary for him to know, but apprenticeship in the old sense is insufficient to supply the requirements of the modern pharmacist. Shop training, all-important as it still remains, is not alone enough; much that is essential to his success cannot be learnt in the shop. How, where, and when can this supplementary knowledge be best acquired?

I have thought that we might derive some assistance in further considering these questions by a knowledge of the system of training adopted in other countries, and in order to obtain the latest information on this point, I put myself in communication early this year with a few leading pharmacists and professors in pharmaceutical schools abroad. To their courteous replies I am indebted for the following details.

The questions I addressed to these gentlemen had reference chiefly to the conditions of apprenticeship or pupilage, and the subsequent or pass examinations enforced in their respective countries. I inquired, further, if pharmacists usually prepared their own galenicals, or purchased them from wholesale manufacturers, and if such manufacturers were subject to any legal restrictions; and I invited my correspondents to express their own views as to whether existing arrangements worked satisfactorily or otherwise.

I have received answers from France, Germany, Austria, Belgium, Italy, Switzerland, Russia, Sweden, Denmark, Holland, the United States, Canada, and Australia.

I propose to furnish these replies as nearly as possible in the words of my correspondents, whose eminent position gives much weight to their opinions.

All the pass examinations include, of course, more or less chemistry, botany, materia medica and pharmacy. For the sake of brevity I have, therefore, omitted these in alluding to the different examinations, merely enumerating those additional subjects which are interest-

ing, as showing the wider range of knowledge required in some countries.

France.—M. A. Petit, President of the Association Générale des Pharmaciens de France, has kindly given me the following particulars:—

Before apprenticeship the youth must obtain the degree of Bachelor of Science, if he wishes to be a pharmacien of the first class, or pass a less difficult examination if he intends to be a pharmacien of the second class. The legal term is three years, and if bound for this period no payment is made on either side, the apprentice receiving board and lodging for his services; but if, as frequently happens, he is bound for only two years, a premium of 900 or 1000 francs is paid. The final or pass examination is the same for pharmaciens of the first and second class, and take place after a three years' course of study at the School of Pharmacy. They include practical pharmacy, toxicology, detection of adulterations, physics, natural history, mineralogy and microscopy. The wholesale manufacturer must be a pharmacien or employ one as a manager.

M. Petit writes:—"The question of apprenticeship is causing us much concern. The three years are badly spent, and this is in a great measure due to the desire of pupils to obtain payment in money. As soon as a pharmacist begins to pay his apprentice he acquits himself of responsibility towards him. Besides this there is not much now done in the laboratory of the pharmacist; he supplies himself from factories to the great detriment of his pupils' chances of instruction. Then there is a new class of *employés* who can manipulate, but are not under any legal obligation; they work under the responsibility of the pharmacist, and never hope to be pharmacists themselves. As these are older and better up in routine work than the regular apprentices they are required to direct the latter, although their instruction is not worth much. Formerly pharmacists took pride in the instruction of their pupils; now young men and their friends strive to obtain the best terms, and attach little importance to the choice of the house where apprenticeship shall be spent. This tendency leads pharmacists to demand 900 or 1000 francs for the first year and after that to allow the pupil to remain or leave, as he likes. We consider this a great evil, and are making earnest efforts to remedy it. An excellent measure has just been adopted. Before commencing their course of study at the School of Pharmacy pupils must submit to an examination to test the practical knowledge obtained during apprenticeship. They must prepare a galenical and a chemical product according to the Codex, recognize a number of medicinal plants and preparations, and show that they possess some theoretical knowledge. We have already secured excellent results from this examination, and in becoming more strict, we shall eventually react first on the pupils and through them on pharmacists. If pupils commence their three years' course of study in the School after a three years' apprenticeship, conscientiously carried out, the scientific level of pharmacy will be much improved."

Germany.—Herr Greiss, writing on behalf of Dr. Brunnengräber, President of the German Pharmaceutical Association, and of Dr. Carl Schacht, has supplied the information sought. I am also indebted to Mr. Louis Siebold for some particulars.

An apprenticeship, of not less than two years, is required for those youths who have matriculated at a University, and of three years for such as have acquired a certificate qualifying them for the *one* year's military service. Pharmacists rarely have more than one apprentice at a time, and undertake his scientific and practical training. The examinations, which are conducted by special committees at the Universities, include laboratory work, analytical chemistry, physics and knowledge of the laws specially affecting pharmacists. Having passed this examination and before owning or managing a business the pharmacist must serve several years as an assistant, and devote eighteen months to study at a University. He may then purchase or hire a business, but he cannot start a new one unless he can obtain from the Government a licence to do so in a locality where the increase of population is sufficient to warrant a further addition to the existing number of pharmacies.

Galenicals are usually prepared in the laboratory of the pharmacist.

Infusions and decoctions are invariably made when required.

Wholesale manufacturers need not pass any examination; they are, however, generally examined pharmacists, or employ such in their factories.

Since pharmacists are required to be competent to undertake chemical analyses they combine in many cases the practice of an analytical chemist with their ordinary calling. My correspondents consider that for the present the laws which regulate the training of pharmacists in Germany are satisfactory.

Austria.—Herr A. von Waldheim, of Vienna, informs me that an apprentice must be not less than fourteen years of age, have spent four years in a gymnasium (higher or grammar school), and have passed the fourth class. He is then bound for three years. This term may, however, be shortened to two years where the youth has spent eight instead of four years in a gymnasium.

The apprentice is trained in both theoretical and practical matters by his master, as only in Vienna is there a school where he can be instructed in the theoretical part of his vocation. At the conclusion of his apprenticeship he passes a practical examination based on the Austrian Pharmacopœia, but including a knowledge of pharmaceutical and sanitary legislation. He must then spend two years at a University, and afterwards pass two theoretical and one practical examination before a commission of professors of the University.

There are some wholesale manufacturers. These are commonly examined pharmacists, though no qualification is legally required. The leading pharmacists of Austria have long wished to improve the present system of training by insisting on the passing of six instead of four classes in a gymnasium previous to apprenticeship, and by enlarging the subsequent course of study at the University so as to include toxicology and the analysis of food. They hope also to establish more pharmaceutical schools similar to the one in Vienna.

Russia.—Herr A. Forsmann, President of the Pharmaceutical Society of St. Petersburg, and Professor Dragendorff, of Dorpat, are the sources of my information.

An apprentice must have passed at least four classes in a classic gymnasium, and must then serve three years in a pharmacy. He pays no premium, but receives besides board and lodging fifty to one hundred roubles a year for dress. The master takes charge of the scientific and technical training of the apprentice, for which he is responsible to the medical authorities; hence, if too much occupied to conduct this personally he supplies the apprentice with the means of pursuing his studies for a time after the end of his term. The assistants' examination (Minor) is conducted by the medical faculty of the University, and includes besides the usual subjects, knowledge of the laws specially affecting pharmacists, and the making of two pharmaceutical preparations in the laboratory of the University. To obtain the higher degrees of provisor and magister and be qualified to open shop on his own account he must serve three years as assistant to a pharmacist and must study two years at a University. The examination for the degree of provisor includes physics, mineralogy and zoology. The title magister is obtained after an extended examination, and having "written and defended a dissertation." This is the highest pharmaceutical degree, and gives great advantage in state and private employment.

Galenicals are prepared by the pharmacist himself, and importation is strictly forbidden.

Dr. Dragendorff considers the existing arrangements satisfactory, but would like to see a gradual increase in the scientific requirements.

Herr Forsmann would insist on the passing of six instead of four classes in the gymnasium previous to apprenticeship. He considers that there can be no substitute for apprenticeship, believing that the practical training necessary can never be so well carried out in any institution or school as in the laboratory of the pharmacist. As a member of the commission for elaborating the system of pharmaceutical education at the medical court Herr Forsmann speaks with authority when he says, "certainly there is no doubt that a higher scientific education will be the foundation of the proposed new regulations."

Belgium.—My correspondent has been Professor Gille, of Brussels. The law demands a two years' apprenticeship after the youth has passed a preliminary technical examination and become what is called a "candidate." This examination includes theoretical and practical chemistry, physics, botany, and the elements of geology and mineralogy. During his apprenticeship he generally attends courses of lectures in one of the schools of pharmacy connected with the universities. It is now proposed to make the Preliminary examination the same as for medical men, *i.e.*, to include rhetoric, logic, and zoology. After apprenticeship, he must pass two other examinations. The first corresponding somewhat to our own Minor, and the second, which is entirely practical, including chemical and pharmaceutical operations, the detection of poisons and adulterations, and microscopic research.

Many pharmacists buy their preparations from manufacturers. Compound medicines can be sold only by qualified pharmacists.

Professor Gille very strongly approves of the increased educational requirements.

Italy.—Mr. Henry Groves, of Florence, and Mr. Squire, of San Remo, supply me with the following particulars.

There is no regular apprenticeship. After leaving school the youth goes to one of the universities for four years, during the last of which he must also practise in a pharmacy, so that he gets three years' University training—which includes examinations in chemistry (general and analytical), botany, materia medica, physics and mineralogy, and he is generally twenty or twenty-one years of age before he commences the practise of pharmacy in a shop.

Mr. Henry Groves is a well-known English pharmacist who has settled at Florence, and has qualified by passing the Italian examinations, going through the prescribed course of study save that portion which was remitted in consideration of his previous training at Bloomsbury Square. I quote a few paragraphs from Mr. Groves's letter, which are especially interesting, and, I think, instructive.

"Although we have been a United Italy so many years, our national pharmacopœia has not yet seen the light, and our great law for the regulation of all branches of the healing art is still being studied. However, the manuscript pharmacopœia has been ready for some time past, and the great Bill is receiving its finishing touches, so that we shall finally be able to range ourselves amongst other nations. Many pharmacists are endeavouring to get the close system of pharmacies, such as obtains in some Italian cities where no new pharmacy can be opened, but at present we do not know what shape the coming law will assume.

"Now as to English assistants, my judgment is based on experience both in England and here, where for many years I have been obliged to employ Germans, for the simple reason that they possess certain qualifications which I looked for in vain amongst my own countrymen. The first of these, and an all important one for us, is the possession of languages. Here we cannot get on without the four principal ones, and I have never yet had any difficulty in finding German assistants who knew three, and who in a ridiculously short time mastered sufficient Italian to get on nicely with the fourth.

"I should like to know how many of our Minor men a year after their 'squeeze through' would be able to undertake a water or urine analysis? Yet to show the advantage of more extended education I may say that I have never had a German assistant who could not set about this task in such a way as to show that he had it all at his fingers' ends."

Switzerland.—My information is derived from Dr. Haslam, of Zurich, and through him with Professor Schär. Apprentices must be not less than 18 or 19 years of age, and must have matriculated. This involves one year's less study than the corresponding examination for medical men, but the majority take the whole matriculation examination. They can then choose whether they will be physicians, lawyers, or pharmacists. If they pass the whole matriculation they are

apprenticed for two years, but if they omit the last year's study, for three years. The matriculation ensures a thorough classical and scientific training.

After apprenticeship the student may present himself for the assistants' examination (Minor). This resembles our own but includes practical pharmacy, I mean the making of preparations. Before passing the Major examination, to be registered as a pharmacist, he must practise pharmacy for several years in one or more pharmaceutical establishments, and study two years in a University, or special school of pharmacy, working during that time in the laboratory of the institution. This examination includes physics, mineralogy, hygiene, sanitation, analysis of food and drugs, microscopic research, and a written memoir on a subject bearing on pharmacy, materia medica, or applied chemistry.

Sweden.—I am indebted to Mr. W. Sebardt, President of the Pharmaceutical Society of Stockholm, for these details.—An apprentice must have been not less than seven years in a gymnasium (grammar school), and have learnt Latin. An apprenticeship of not less than three years is required, but not necessarily with one pharmacist. If either the master or apprentice be dissatisfied, a change may be made. He must, however, spend not less than one year with the same pharmacist. He receives board and lodging and a small payment for his services. Having passed a Minor examination, he must serve two years as assistant, then two years at the Pharmaceutical College at Stockholm, before he presents himself for the final or qualifying examination. The examinations are conducted by the Professors at the Pharmaceutical College, and two pharmacists. They include physics, zoology, and pharmaceutical legislation. Pharmacists make their own preparations, and there are no wholesale manufacturers. Mr. Sebardt approves of existing arrangements.

Denmark.—Mr. Madsen, of Copenhagen, has given me much interesting information. Previous to apprenticeship the youth must pass a "Preliminary" at the University, or at any of the Grammar Schools. This examination includes English, Latin, history, geography, mathematics, natural history, and natural philosophy. The pharmacist who takes an apprentice must report the fact to the physician appointed by Government for his district, to whom he must send the examination certificate. The term is three and a half years, but the Ministry of Justice can shorten this in favour of an exceptionally diligent or clever apprentice, on the petition of the pharmacist with whom he is articled. At its expiration the pharmacist gives an indenture containing a statement of the apprentice's conduct and progress, who then presents himself for the first or Minor examination, and, should he fail, his master is compelled to take him back and allow him to continue his apprenticeship until the next examination. The "Minor" includes similar subjects to our own, with the addition of a knowledge of pharmaceutical legislation. Having passed this, he is qualified to dispense prescriptions in any pharmacy in Denmark. But in order to manage or own a pharmacy himself, he must spend at least a year and a half at the University of Copenhagen, and pass an extended and higher examination. The examinations are conducted twice a year by a Board consisting of the Professors of the University and one pharmacist. Pharmacists prepare all their galenicals and Pharmacopœia preparations can be purchased only of them.

Holland.—Dr. de Vrij has kindly replied fully to my inquiries.

There is no formal apprenticeship, but a candidate for the final examination must produce a certificate from a legally-qualified pharmacist that he has worked two years in a pharmacy. "In a free country like ours," writes Dr. de Vrij, "there exists no curriculum. The future pharmacist is quite at liberty to get the required knowledge wherever he likes, and in whatever time." Four examinations have, however, to be passed before the candidate is qualified to practise pharmacy.

First.—A Preliminary, which includes Dutch, French, German and Latin, arithmetic and mathematics.

Second.—Theoretical chemistry, physics, botany and the elements of mineralogy and zoology.

Third.—Theoretical pharmacy. The application of the physical sciences to pharmacy.

Fourth.—The final or pass examination, which is entirely practical, and lasts about a week. The candidate is required to make chemical and pharmaceutical preparations, to standardize drugs, such as opium and cinchona, to detect adulterations in articles of food and medicine, and to prove practically that he is well up in the duties of a pharmacist generally. The final examination is conducted by a board, which must include two pharmacists.

There is also in Holland a special or modified examination for assistants. Dr. de Vrij states that amongst these qualified assistant pharmacists are a great many young ladies. "I know some of them," he adds, "whom I would prefer to a male assistant." Notwithstanding this elaborate education and training many pharmacists buy their preparations from manufacturers, who need not have passed any examination; but every pharmacy in the kingdom is inspected once a year by a special commission, when the pharmacist is held responsible for the quality of his stock, and is fined for every article which is unsatisfactory. "In this way," says Dr. de Vrij, "the evil caused by the fact that manufacturers have passed no qualifying examination is made less dangerous."

Dr. de Vrij adds that the decreasing number of pharmacists in Holland has been erroneously ascribed to the increase in the practise of dispensing by medical men. As a matter of fact dispensing by medical men is strictly forbidden by law in any locality where a pharmacy exists. The decrease is due, he says, to the increased stringency of the examinations, and he concludes as follows, "Since 1849 I have always advocated severe examinations with a view to decrease the number of pharmacists, and elevate the dignity of the profession. I feel happy that I have lived long enough to see in my old age that my endeavours have not been in vain."

The United States.—My correspondents have been Dr. Squibb, of Brooklyn, New York, and Professor

Maisch, of Philadelphia. There is no legal apprenticeship in the States. Boys usually enter the shop at about 16 years of age, and though called apprentices commence as messengers, bottle washers, etc. They are paid from one to three dollars per week, and what information they acquire while in such capacity is generally in a haphazard way by contact with the business. They are taught only what is connected with their special duties, and commonly their stimulus to learn is the hope of increased pay. They get instruction from their employers in proportion as they are intelligent and apt to learn, but the instruction is mainly in the mechanical part and shop routine. Employers cannot avoid the influence of the fact that a sharp, instructed boy may be instructed for competitors, as he may at any time change employers for better wages. Scientific training, such as is afforded by high schools and academies, is in many cases had before entering the business. They then depend on reading and what practice they can get before attending the schools of pharmacy.

In order to obtain a licence to practise pharmacy, that is to dispense prescriptions on their own account, they must have had two years' experience in a pharmacy, have attended two courses in a School of Pharmacy, and have passed an examination which is of a practical rather than a scientific character.

The majority of pharmacists make their most simple preparations, but a large number buy nearly all from wholesale manufacturers, who generally become such from being successful pharmacists, though no restrictions exist.

Dr. Squibb concludes his letter as follows:—"The system of early training of pharmacists in this country is not satisfactory, and is only successful in part, upon principles of natural selection and survival of the fittest. There happen to be enough young men with sufficient education, educability, and intelligence, who try pharmacy as a means of living, and of these enough are found to acquire an appetite for that kind of knowledge, and to lead the others and be successful."

Prof. Maisch concludes:—"I do not think that in the United States the educational attainments previous to learning the business, or the course of study during or subsequent to apprenticeship will be regulated by law. There is as yet little prospect of the enactment of laws requiring systematic scientific education to precede the qualifying examination. Instruction at the College of Pharmacy is sought voluntarily by young men in quest of knowledge."

Canada.—Mr. A. H. Mason, Ex-President of the Montreal College of Pharmacy, has kindly obtained from gentlemen in the different provinces particulars of the system of training adopted in each. These differ somewhat, but time will only permit a reference to that of the Province of Quebec. Boys are not bound by legal indenture, but are generally engaged with the understanding that they will remain at least three years. They are usually paid from 2 to 4 dollars a week, and in the cities live with their parents or board out.

A Preliminary examination in English, French, Latin, and arithmetic is required, after which they are placed on the register of the Pharmaceutical Association of the province as "registered apprentices." Any pharmacist employing an apprentice not so registered is subject to a penalty. Having served not less than three years he passes his Minor, and is placed on the register as a "registered clerk." Before he can be registered as a "licentiate of pharmacy," and be fully qualified, he must spend four years as assistant, and attend two courses of lectures on chemistry, two on materia medica, and one on botany. The lectures in Montreal are given at night, so that students may retain their situations whilst attending them. The pass examination appears to resemble our Minor.

Australia.—Professor Jackson, Director of the College of Pharmacy, Melbourne, has supplied me with particulars which refer only to Victoria, the most advanced of the Australian Colonies.

An apprenticeship of four years to a registered pharmacist is required. Masters usually instruct apprentices in shop routine and business habits only, but are compelled by law to allow time during apprenticeship for attendance at classes, etc., at the College of Pharmacy. A Preliminary examination, which includes English, Latin and arithmetic, must be passed prior to apprenticeship. The qualifying examination resembles our own, and is partly written and partly *vivâ voce*. It is conducted by a Board composed of pharmacists and teachers.

In Prof. Jackson's opinion the means of early training in Victoria are superior to those in any part of the British Empire. "They would be improved," he says, "by making the course of instruction extend over one University session (a year of three terms). This was the case two years ago, but was altered to a five months' course, as at Bloomsbury Square. Thus there are two courses a year, the same subjects being repeated, but we are hoping to alter this next year, and let the teaching spread over eight or nine months. A five months' curriculum is too brief. A course of lectures or of practical work extending over the University year affords enough time to cover the work required, to pass examinations intelligently, and to make the knowledge real and usable. The various vacations enable students to make up time lost by dulness, sickness, pressure of other engagements, etc. A continuous session without breaks is a blunder. Lectures follow too quickly for the average student to keep pace, and when he is once left behind he never catches up, and the course is wasted."

Such is a brief and necessarily imperfect sketch of the systems and methods of pharmaceutical training adopted abroad. Are there any practical lessons to be learnt from it?

We find, first, that in most countries not only has a Preliminary examination, much wider than our own, to be passed, but a more or less prolonged school curriculum is demanded before apprenticeship. In the present defective and unsystematic condition of middle-class education in England, it is probably, as yet, impracticable to insist on any definite pre-apprenticeship curriculum, desirable as it would be. But I am very strongly of opinion, and my opinion is based on a long experience as a member of the English Board of Examiners, that our Preliminary should in-

clude a broader range of subjects, so as to form a better test of the intellectual development of the candidate. I wish it could be made to include some science, as in France, Germany, Belgium, Switzerland, Italy, Sweden, and Denmark.

We may prepare the way for the ultimate introduction of a pre-apprenticeship curriculum by the exercise of greater care and discrimination in the selection of our apprentices or pupils, by declining to receive, under any circumstances, youths who have not had what is called a good education,—that is, as good as can be got,—by insisting on the passing of our present "Preliminary" as a minimum pre-apprenticeship qualification, and by choosing, as far as possible, those who have already been taught some elementary science.

Quain, when President of the College of Surgeons, after describing in his Hunterian oration the crowd of studies undertaken at once by the medical student, said:—"Supposing that at school young people had acquired some exact elementary knowledge of physics, chemistry, and a branch of natural history—say botany—and the physiology connected with it, they would then have gained necessary knowledge, with some practice in inductive reasoning—the best discipline of the mind for the purposes of life."

Such a training is certainly no less desirable for the pharmaceutical than the medical student.

In a paper read before this Conference at Liverpool, eighteen years ago, I ventured to hint at the possibility of establishing a special school or schools for boys intending to be pharmacists. It seemed to me then, as it does still, that if a youth could enter on his apprenticeship having already had a year or two's special training in the sciences bearing on his vocation, his progress would be much more rapid and secure, and he would be less dependent on those about him for instruction in such matters.

Possibly, a two years' apprenticeship (as is permitted in Germany, Austria, Belgium, Switzerland, and Denmark) might then be sufficient to qualify him to act as a junior assistant, and he would be able to obtain a wider experience in those larger businesses where—though apprentices are not taken—junior assistants are employed.

Last year 1373 boys presented themselves for our "Preliminary," an increase of 68 on the previous year. I wonder whether the friends and guardians of a sufficient number of these to support a special school would have availed themselves of it had one been in existence? Could any existing institution tack on to its present course of teaching a junior department for would-be pharmacists?

On reviewing the regulations of other countries as regards the final qualification to practice pharmacy, we see that although a considerably greater range of knowledge is required than we as yet demand—reliance is not, as a rule, placed on examination alone. More or less lengthened periods of study at a University,—years of service as an assistant,—must be undergone before a full diploma is granted to the pharmacist. Our continental brethren clearly recognize the importance of combining practice with theory, and education with examination. They have learnt that courses of lectures, long or short, plain or illustrated, will avail little if these are not associated with practical work. "Touch and handle," was the earnest injunction of Nasmyth, the great Manchester engineer, "remembering," said he, "that gloves, especially kid gloves, are non-conductors of knowledge."

It will be noticed that in Germany, Austria, Russia, Sweden and Denmark a knowledge of the laws specially affecting pharmacists is demanded. This is a very wise requirement, and might with much advantage be insisted on here. Astounding ignorance of our own Pharmacy and Poisons Acts is often displayed by those who are most interested in their operation.

Some of the conditions under which pharmacy is practised in most continental countries differ, as everybody knows, from those which obtain here, but such protection as exists is accompanied by restrictions and regulations, many of which would be irksome or unbearable to us. I think we shall do well not to undervalue our own freedom.

In conclusion, let me urge on those who are entering our ranks, and on you, gentlemen, who are in a position to influence the opinions of some of them—that they should regard their scientific education—not as a troublesome impediment placed in their way by a reckless Parliament, prompted by a pedantic Society,—but as the very key to future success.

In the words of Huxley, written twenty years ago, but perhaps even more strikingly true now than then, "As industry attains higher stages of development, as its processes become more complicated and refined, and competition more keen, the sciences are dragged in one by one to take their share in the fray, and he who can best avail himself of their help is the man who will come out uppermost in that struggle for existence which goes on as fiercely beneath the smooth surface of modern society as amongst the wild inhabitants of the woods."

Mr. S. ATKINS rose to propose a vote of thanks to the President for his admirable address, and he did so, not only in the name of those present, but of the much greater body of pharmacists who would read it in print. He had long known their highly esteemed President, who was remarkable for the rare combination of high scientific attainments with a plain practical knowledge of the business of pharmacy; and it was on that combination of a grasp of great principles and a careful attention to their practical application that Pharmacy must be built up. Those who knew the President personally were sure that he would be capable of rising to the height of the occasion—and it was the occasion which revealed the man—as he had now done in presenting this address. It was so comprehensive and yet so full of detail, that the highest compliment pharmacists could pay to the author would be to carefully ponder it hereafter, but he would thank him especially for the great pains he had taken to arrive at the facts with regard to Continental and foreign pharmacy. Mr. Benger had been able to go to the representative men in each country, and the statements they had made could be accepted with the utmost confidence. One lesson which had deeply impressed itself on his own mind was, that in

every country, with the possible exception of America, there was a prolonged and careful training of youth before they entered pharmacy, and this would agree with the experience of all who had made personal enquiries on the subject on the Continent. There were many other points of interest in the address to which he could not allude, but he was sure that all present would agree in a very cordial vote of thanks.

Mr. BOTTLE said he had much pleasure in seconding the motion, but the opening remarks of the President with reference to Mr. Deane had affected him so deeply that he could not say many words. It was his privilege to be present on many occasions when Mr. Deane had given the results of his knowledge and experience, but it was also his privilege to be present at his death at Dover, and he could not help being much moved by the reference to him.

Mr. MARTIN (Newcastle) wished to add his tribute to what had been said by the President and Mr. Bottle with reference to the late Henry Deane. As his pupil and assistant he could bear testimony to the intense interest which he took in the education of young men, and to his warm interest in the Conferences, which he attended to the last year of his life. He was sure that if Mr. Deane had been spared to see its silver wedding no one would have rejoiced more at the unqualified success which had attended it. He was glad to say that few of those present at the first meeting at Newcastle had been removed by the hand of death, and when the next meeting was held there, very many of the original founders would no doubt be present. It was impossible at the conclusion of an address covering so much ground to offer any comments upon it, but he desired to thank the President personally for pointing out how, by means of education, the pharmacist of the future might be fitted to struggle with the difficulties of life. There might be points of detail on which they might differ, and in particular he might refer to one remark from which it might be inferred that Mr. Benger's opinion was that foreigners were more and more interfering with the progress of English commerce and industry, owing to the want of education amongst the people of this country. He thought there was a danger of being led off into side issues on this point, and that it would be interesting to go to China, Germany, and other countries, and see what proportion of Englishmen trained on the old methods of education were there holding responsible and remunerative positions, which had a great influence on the competition exercised by those countries. There were other influences at work, also, and one purely pharmaceutical instance occurred to his mind at the moment. Until recently all the caffeine used in this country had been manufactured abroad, but within the last two or three weeks an English firm had found the means of making it.

The motion having been put by Mr. ATKINS was carried unanimously.

The PRESIDENT briefly returned his thanks for the kind reception which had been given to his address. He was conscious that it presented many of the worst features of a sermon, but he might say that he had only given expression to what he thoroughly believed, and he had only been preaching what he had endeavoured to practice throughout his life.

The American Pharmaceutical Association.

The PRESIDENT suggested that it would be a graceful act of courtesy to send a telegram of congratulation to the American Pharmaceutical Association, which was now in session in Detroit, and this was at once agreed to.

(*To be continued.*)

The British Association for the Advancement of Science.

FIFTY-SEVENTH ANNUAL MEETING.

The fifty-seventh annual meeting of the above Association commenced on Wednesday, September 5, at Bath, under the Presidency of Sir Frederick J. Bramwell, D.C.L., F.R.S., M.Inst.C.E.

THE PRESIDENT'S ADDRESS.

The late Lord Iddesleigh delighted an audience for a whole evening by an address on "Nothing." Would that I had his talents, and could discourse to you as charmingly as he did to his audience, but I dare not try to talk about "Nothing." I do however propose, as one of the two sections of my address, to discourse to you on the importance of the "Next-to-Nothing." The other section is far removed from this microscopic quantity, as it will embrace the "eulogy of the civil engineer, and will point out the value to science of his works."

I do not intend to follow any system in dealing with these two sections. I shall not even do as Mr. Dick, in 'David Copperfield,' did—have two papers, to one of which it was suggested he should confine his memorial and his observations as to King Charles's head. The result is, you will find, that the importance of the next-to-nothing, and the laudation of the civil engineer, will be mixed up in the most illogical and haphazard way throughout my address. I will leave to such of you as are of orderly minds the task of rearranging the subjects as you see fit, but I trust—arrangement or no arrangement—that by the time I have brought my address to a conclusion, I shall have convinced you that there is no man who more thoroughly appreciates the high importance of the "next-to-nothing" than the civil engineer of the present day, the object of my eulogy this evening.

If I may be allowed to express the scheme of this address in modern musical language, I will say that the "next-to-nothing" "motive" will commonly usher in the "praise-song" of the civil engineer; and it seems to me will do this very fitly, for in many cases it is by the patient and discriminating attention paid to the effect of the "next-to-nothing" that the civil engineer of the present day has achieved some of the labours of which I now wish to speak to you.

An Association for the Advancement of Science is necessarily one of such broad scope in its objects, and is so thoroughly catholic as regards science, that the only possible way in which it can carry out those objects at all is to segregate its members into various subsidiary bodies or sections engaged on particular branches of science. Even when this division is resorted to, it is a hardy thing to say that every conceivable scientific subject can be dealt with by the eight sections of the British Association. Nevertheless, as we know, for fifty-seven years the Association has carried on its labours under sections, and has earned the right to say that it has done good service to all branches of science.

Composed, as the Association is, of a union of separate sections, it is only right and according to the fitness of things that, as time goes on, your Presidents should be selected, in some sort of rotation, from the various sections. This year it was felt, by the Council and the members, that the time had once more arrived when Section G—the Mechanical Section—might put forward its claim to be represented in the Presidency; the last time on which a purely engineering member filled the chair having been at Bristol, in 1875, when that position was occupied by Sir John Hawkshaw. It is true that at Southampton, in 1882, our lamented friend, Sir William Siemens, was President, and it is also true that he was a most thorough engineer and

representative of Section G; but all who knew his great scientific attainments will probably agree that on that occasion, it was rather the Physical Section A which was represented than the Mechanical Section G.

I am aware it is said Section G does not contribute much to pure science by original research, but that it devotes itself more to the application of science. There may be some foundation for this assertion; but I cannot refrain from the observation that when engineers, such as Siemens, Rankine, Sir William Thomson, Fairbairn, or Armstrong, make a scientific discovery, Section A says it is made, not in the capacity of an engineer, and, therefore, does not appertain to Section G, but in the capacity of a physicist, and therefore appertains to Section A—an illustration of the danger of a man's filling two positions, of which the composite prince-bishop is the well-known type. But I am not careful to labour this point, or even to dispute that Section G does not do much for *original* research. I do not agree it is a fact, but, for the purposes of this evening, I will concede it to be so. But what then? This Association is for the "advancement of science"—the *advancement*, be it remembered; and I wish to point out to you, and I trust I shall succeed in establishing, that for the *advancement* of science it is absolutely necessary there should be the *application* of science, and that, therefore, the section, which as much as any other (or, to state the fact more truly, which more than any other) in the Association *applies* science, is doing a very large share of the work of *advancing* science, and is fully entitled to be periodically represented in the Presidency of the whole Association.

I trust also I shall prove to you that applications of science, and discoveries in pure science, act and re-act the one upon the other. I hope in this to carry the bulk of my audience with me, although there are some, I know, whose feelings, from a false notion of respect for science, would probably find vent in the "toast" which one has heard in another place—this "toast" being attributed to the pure scientist—"Here's to the latest scientific discovery: may it never do any good to anybody!"

To give an early illustration of this action and re-action, which I contend occurs, take the well-worn story of Galileo, Torricelli, and the pump-maker. It is recorded that Galileo first, and his pupil Torricelli afterwards, were led to investigate the question of atmospheric pressure by observing the failure of a pump to raise water by "suction" above a certain level. Perhaps you will say the pump-maker was not applying science, but was working without science. I answer, he was unknowingly applying it, and it was from that which arose in this unconscious application that the mind of the pure scientist was led to investigate the subject, and thereupon to discover the primary fact, of the pressure of the atmosphere, and the subsidiary facts which attend thereon. It may appear to many of you that the question of the exercise of pressure by the atmosphere should have been so very obvious, but little merit ought to have accrued to the discoverer; and that the statement, once made, must have been accepted almost as a mere truism. This was, however, by no means the case. Sir Kenelm Digby, in his "Treatise on the Nature of Bodies," printed in 1658, disputes the proposition altogether, and says, in effect, he is quite sure the failure of the pump to raise water was due to imperfect workmanship of some kind or description, and had nothing to do with the pressure of the air; and that there is no reason why a pump should not suck up water to any height. He cites the boy's sucker, which, when applied to a smooth stone will lift it, and he says the reason why the stone follows the sucker is this. Each body must have some other body in contact with it. Now, the stone being in contact with the sucker there is no reason why that contact should be broken up, for the mere purpose of substituting the contact of another body, such as the air. It seems pretty clear, therefore, that even to an acute and well-trained mind, such as that of Sir Kenelm Digby, it was by no means a truism, and to be forthwith accepted when once stated, that the rise of water on the "suction side" of a pump was due to atmospheric pressure. I hardly need point out that the pump-maker should have been a member of "G." Galileo and Torricelli, led to reflect by what they saw, should have been members of "A" of the then "Association for the Advancement of Science."

But, passing away from the question of the value of the application of science of a date some two and a half centuries ago, let us come a little nearer to our own times.

Electricity—known in its simplest form to the Greeks by the results arising from the friction on amber, and named therefrom; afterwards produced from glass cylinder machines, or from plate machines; and produced a century ago by the "Influence" machine—remained, as did the discoveries of Volta and Galvani, the pursuit of but a few, and even the brilliant experiments of Davy did not suffice to give very great impetus to this branch of physical science.

Ronalds, in 1823, constructed an electric telegraph. In 1837 the first commercial use was made of the telegraph, and from that time electrical science received an impulse such as it had never before experienced. Further scientific facts were discovered; fresh applications were made of these discoveries. These fresh applications led to renewed vigour in research, and there was the action and reaction of which I have spoken. In the year 1871 the Society of Telegraph Engineers was established. In the year 1861 our own Association had appointed a Committee to settle the question of electrical standards of resistance, which committee, with enlarged functions, continued its labours for twenty years, and of this Committee I had the honour of being a member. The results of the labours of that Committee endure (somewhat modified, it is true), and may be pointed to as one of the evidences of the value of the work done by the British Association. Since Ronalds's time, how vast are the advances which have been made in electrical communication of intelligence, by land lines, by submarine cables all over the world, and by the telephone! Few will be prepared to deny the statement that pure electrical science has received an enormous impulse, and has been advanced by the commercial application of electricity to the foregoing, and to purposes of lighting. Since this latter application, scores, I may say hundreds, of acute minds have been devoted to electrical science, stimulated thereto by the possibilities and probabilities of this application.

In this country, no doubt, still more would have been done if the lighting of districts from a central source of electricity had not been, since 1882, practically forbidden by the Act passed in that year. This Act had in its title the facetious statement that it was "to facilitate Electrical Lighting"—although it is an Act which, even modified as it has been this year, is still a great discouragement of free enterprise, and a bar to progress. The other day a member of the House of Commons was saying to me: "I think it is very much to our discredit in England that we should have allowed ourselves to be outrun in the distribution of electric lighting to houses, by the inhabitants of the United States, and by those of other countries." Looking upon him as being one of the authors of the "facetious" Act, I thought it pertinent to quote the case of the French parricide, who, being asked what he has to say in mitigation of punishment, pleads, "Pity a poor orphan"—the parricide and the legislator being both of them authors of conditions of things

which they affect to deplore. I will say no more on this subject, for I feel that it would not be right to take advantage of my position here to night to urge political economy views, which should be reserved for Section F. I will merely, and as illustrative of my views of the value of the application of science to science itself, say there is no branch of physics pursued with more zeal and with more happy results than that of electricity, with its allies, and there is no branch of science towards which the public looks with greater hope of practical benefits; a hope that, I doubt not, will be strengthened after we have had the advantage of hearing one of the ablest followers of that science, Professor Ayrton, who, on Friday next, has been good enough to promise to discourse on "The Electrical Transmission of Power."

One of the subjects which, as much as (or probably more than) any other, occupies the attention of the engineer, and therefore of Section G, is that of (the so-called) Prime Movers, and I will say boldly that, since the introduction of printing by the use of moveable type, nothing has done so much for civilization as the development of these machines. Let us consider these prime movers—and, first, in the comparatively humble function of replacing that labour which might be performed by the muscular exertion of human beings, a function which at one time was looked upon by many kindly but short-sighted men as taking the bread out of the mouth of the labourer (as it was called), and as being therefore undesirable. I remember revisiting my old schoolmaster, and his saying to me, shaking his head, "So you have gone the way I always feared you would, and are making things of iron and brass, to do the work of men's hands."

It must be agreed that all honest and useful labour is honourable, but when that labour can be carried out without the exercise of any intelligence, one cannot help feeling that the result is likely to be intellectually lowering. Thus it is a sorry thing to see unintelligent labour, even although that labour be useful. It is but one remove from unintelligent labour which is not useful; that kind of labour generally appointed (by means of the tread-wheel or the crank) as a punishment for crime. Consider even the honourable labour (for it is useful, and it is honest) of the man who earns his livelihood by turning the handle of a crane, and compare this with the labour of a smith, who, while probably developing more energy by the use of his muscles, than is developed by the man turning the crane-handle, exercises at the same time the powers of judgment, of eye, and of hand in a manner which I never see without my admiration being excited. I say that the introduction of prime movers as a mere substitute for unintelligent manual labour is in itself a great aid to civilization and to the raising of humanity, by rendering it very difficult, if not impossible, for a human being to obtain a livelihood by unintelligent work—the work of the horse in the mill, or of the turnspit.

But there are prime movers and prime movers—those of small dimensions, and employed for purposes where animal power or human power might be substituted, and those which attain ends that by no conceivable possibility could be attained at all by the exertion of muscular power.

Compare a galley, a vessel propelled by oars, with the modern Atlantic liner; and first let us assume that prime movers are non-existent and that this vessel is to be propelled galley-fashion. Take her length as some 600 feet, and assume that place be found for as many as 400 oars on each side, each oar worked by 3 men, or 2400 men; and allow that 6 men under these conditions could develope work equal to one horse-power: we should have 400 horse-power. Double the number of men, and we should have 800 horse-power, with 4800 men at work, and at least the same number in reserve, if the journey is to be carried on continuously. Contrast the puny result thus obtained with the 19,500 horse-power given forth by a large prime mover of the present day, such a power requiring, on the above mode of calculation, 117,000 men at work, and 117,000 in reserve; and these to be carried in a vessel less than 600 feet in length. Even if it were possible to carry this number of men in such a vessel, by no conceivable means could their power be utilised so as to impart to it a speed of twenty knots an hour.

This illustrates how a prime mover may not only be a mere substitute for muscular work, but may afford the means of attaining an end, that could not by any possibility be attained by muscular exertion, no matter what money was expended or what galley-slave suffering was inflicted.

Take again the case of a railway locomotive. From 400 to 600 horse-power developed in an implement which, even including its tender, does not occupy an area of more than fifty square yards, and that draws us at sixty miles an hour. Here again the prime mover succeeds in doing that which no expenditure of money or of life could enable us to obtain from muscular effort.

To what, and to whom, are these meritorious prime movers due? I answer: to the application of science, and to the labours of the civil engineer, using that term in its full and proper sense, as embracing all engineering other than military. I am as you know a civil engineer, and I desire to laud my profession and to magnify mine office; and I know of no better means of doing this than by quoting to you the definition of "civil engineering," given in the Charter of The Institution of Civil Engineers, namely, that it is "the art of directing the great sources of power in Nature for the use and convenience of man." These words are taken from a definition or description of engineering given by one of our earliest scientific writers on the subject, Thomas Tredgold, who commences that description by the words above quoted, and who, having given various illustrations of the civil engineer's pursuits introduces this pregnant sentence:—

"This is, however, only a brief sketch of the objects of civil engineering, the real extent to which it may be applied is limited only by the progress of science; its scope and utility will be increased with every discovery in philosophy, and its resources with every invention in mechanical or chemical art, since its bounds are unlimited, and equally so must be the researches of its professors."

"The art of directing the great sources of power in Nature for the use and convenience of man." Among all secular pursuits, can there be imagined one more vast in its scope, more beneficent, and therefore more honourable, than this? There are those, I know—hundreds, thousands—who say that such pursuits are not to be named as on a par with those of literature; that there is nothing ennobling in them; nothing elevating; that they are of the earth, earthy; are mechanical, and are unintellectual, and that even the mere bookworm, who, content with storing his own mind, neither distributes those stores to others nor himself originates, is more worthily occupied than is the civil engineer.

I deny this altogether, and, while acknowledging, with gratitude, that, in literature, the master-pieces of master minds have afforded, and will afford, instruction, delight, and solace for all generations, so long as civilization endures, I say that the pursuits of civil engineering are worthy of occupying the highest intelligence, and that they are elevating and ennobling in their character.

Remember the kindly words of Sir Thomas Browne, who said, when condemning the uncharitable conduct of the mere bookworm, "I make not, therefore, my head a grave, but a treasure of knowledge, and study

not for mine own sake only, but for those who study not for themselves." The engineer of the present day finds that he must not make his "head a grave," but that, if he wishes to succeed, he must have, and must exercise, scientific knowledge; and he realizes daily the truth that those who are to come after him must be trained in science, so that they may readily appreciate the full value of each scientific discovery as it is made. Thus the application of science by the engineer not only stimulates those who pursue science, but adds him to their number.

Holding, as I have said I do, the view that he who displaces unintelligent labour is doing good to mankind, I claim for the unknown engineer who, in Pontus, established the first water-wheel of which we have a record, and for the equally unknown engineer who first made use of wind for a motor, the title of pioneers in the raising of the dignity of labour, by compelling the change from the non-intelligent to the intelligent.

With respect to these motors—wind and water—we have two proverbs which discredit them: "Fickle as the wind," "Unstable as water."

Something more trustworthy was needed—something that we were sure of having under our hands at all times. As a result, science was applied, and the "fire" engine, as it was first called, the "steam" engine, as it was re-named, a form of "heat" engine, as we now know it to be, was invented.

Think of the early days of the steam-engine—the pre-Watt days. The days of Papin, Savory, Newcomen, Smeaton! Great effects were produced, no doubt, as compared with no fire-engine at all; effects so very marked as to extort from the French writer, Belidor, the tribute of admiration he paid to the "fire" engine erected at the Fresnes Colliery by English engineers. A similar engine worked the pumps in York Place (now the Adelphi) for the supply of water to portions of London. We have in his work one of the very clearest accounts, illustrated by the best engravings (absolute working drawings), of the engine which had excited his admiration. These drawings show the open-topped cylinder, with condensation taking place below the piston, but with the valves worked automatically.

It need hardly be said that, noteworthy as such a machine was, as compared with animal power, or with wind or water motors, it was of necessity a most wasteful instrument as regards fuel. It is difficult to conceive in these days how, for years, it could have been endured that at each stroke of the engine the chamber that was to receive the steam at the next stroke was carefully cooled down beforehand by a water injection.

Watt, as we know, was the first to perceive, or, at all events, to cure, this fundamental error which existed prior to his time in the "fire" engine. To him we owe condensation in a separate vessel, the doing away with the open-topped cylinder, and the making the engine double-acting; the parallel motion; the governor; and the engine indicator, by which we have depicted for us the way in which the work is being performed within the cylinder. To Watt, also, we owe that great source of economic working—the knowledge of the expansive force of steam; and to his prescience we owe the steam jacket, without which expansion, beyond certain limits, is practically worthless. I have said, "prescience,"—foreknowledge—but I feel inclined to say that, in this case, prescience may be rendered "pre-science," for I think that Watt *felt* the utility of the steam jacket, without being able to say on what ground that utility was based.

I have already spoken in laudatory terms of Tredgold, as being one of the earliest of our scientific engineering writers, but, as regards the question of steam jacketing, Watt's prescience was better than Tredgold's science, for the latter condemns the steam jacket, as being a means whereby the cooling surfaces are enlarged, and whereby, therefore, the condensation is increased.

I think it is not too much to say, that engineers who, since Watt's days, have produced machines of such marvellous power—and, compared with the engines of Watt's days, of so great economy—have, so far as principles are concerned, gone upon those laid down by Watt. Details of the most necessary character—necessary to enable those principles to be carried out—have, indeed, been devised since the days of Watt. Although it is still a very sad confession to have to make, that the very best of our steam engines only utilizes about one-sixth of the work which resides (if the term may be used) in the fuel that is consumed, it is, nevertheless, a satisfaction to know that great economical progress has been made, and that the 6 or 7 lbs. of fuel per horse-power per hour consumed by the very best engines of Watt's days, when working with the aid of condensation, is now brought down to about one-fourth of this consumption; and this in portable engines, for agricultural purposes, working without condensation—engines of small size, developing only 20 horse-power; in such engines the consumption has been reduced to as little as 1·85 lb. per brake horse-power per hour, equal to 1·65 lb. per indicated horse-power per hour, as was shown by the trials at the Royal Agricultural Society's meeting at Newcastle last year—trials in which I had the pleasure of participating.

In these trials, Mr. William Anderson, one of the Vice-Presidents of Section G, and I were associated, and, in making our report of the results, we adopted the balance-sheet system, which I suggested and used so long ago as 1873 (see vol. lii., pages 154 and 155, of the 'Minutes of Proceedings of the Institution of Civil Engineers'), and to which I alluded in my address as President of G at Montreal.

I have told you that the engineer of the present day appreciates the value of the "next-to-nothings." There is an old housekeeping proverb that, if you take care of the farthings and the pence the shillings and the pounds will take care of themselves. Without the balance-sheet one knows that for the combustion of 1 lb. of coal, the turning into steam of a given quantity of water at a given pressure is obtained. It is seen at once, that the result is much below that which should be had, but to account for the deficiency is the difficulty. The balance-sheet, dealing with the most minute sources of loss—the farthings and the pence of economic working—brings you face to face with these, and you find that improvement must be sought in paying attention to the "next-to-nothings."

Just one illustration. The balance-sheet will enable you at a glance to answer this among many important questions. Has the fuel been properly burnt?—with neither too much air, nor too little.

At the Newcastle trials our knowledge as to whether we had the right amount of air for perfect combustion was got by an analysis of the waste gases, taken continuously throughout the whole number of hours' run of each engine, affording, therefore, a fair average. The analysis of any required portion of gases thus obtained was made in a quarter of an hour's time by the aid of the admirable apparatus invented by Mr. Stead, and, on the occasion to which I refer, manipulated by him. In one instance an excess of air had been supplied, causing a percentage of loss of 6·34. In the instance of another engine there was a deficiency of air, resulting in the production of carbonic oxide, involving a loss of 4 per cent. The various percentages of loss, of which each one seems somewhat unimportant, in the aggregate amounted to 28 per cent., and this was one of the best boilers. This is an admirable instance of the need of attention to apparently small things.

I have already said that we now know the steam engine is really a heat engine. At the York meeting of our Association I ventured to predict that, unless

some substantive improvement were made in the steam engine (of which improvement, as yet, we have no notion), I believed its days, for small powers, were numbered, and that those who attended the centenary of the British Association in 1931 would see the present steam engine in museums, treated as things to be respected, and of antiquarian interest to the engineers of those days, such as are the open-topped steam cylinders of Newcomen and of Smeaton to ourselves. I must say I see no reason, after the seven years which have elapsed since the York meeting, to regret having made that prophecy, or to desire to withdraw it.

The working of heat engines, without the intervention of the vapour of water, by the combustion of the gases arising from coal, or from coal and from water, is now not merely an established fact, but a recognized and undoubted, commercially economical, means of obtaining motive power. Such engines, developing from 1 to 40-horse power, and worked by the ordinary gas supplied by the gas mains, are in most extensive use in printing works, hotels, clubs, theatres, and even in large private houses, for the working of dynamos to supply electric light. Such engines are also in use in factories, being sometimes driven by the gas obtained from "culm" and steam, and are giving forth a horse-power for, it is stated, as small a consumption as one pound of fuel per hour.

It is hardly necessary to remind you—but let me do it—that, although the saving of half a pound of fuel per horse-power appears to be insignificant, when stated in that bald way, one realizes that it is of the highest importance when that half-pound turns out to be 33 per cent. of the whole previous consumption of one of those economical engines to which I have referred.

The gas engine is no new thing. As long ago as 1807, a M. de Rivaz proposed its use for driving a carriage on ordinary roads. For anything I know he may not have been the first proposer. It need hardly be said that in those days he had not illuminating gas to resort to, and he proposed to employ hydrogen. A few years later, a writer in *Nicholson's Journal*, in an article on "flying machines," having given the correct statement that all that is needed to make a successful machine of this description is to find a sufficiently light motor, suggests that the direction in which this may be sought is the employment of illuminating gas, to operate by its explosion on the piston of an engine. The idea of the gas engine was revived, and formed the subject of a patent by Barnett in the year 1838. It is true this gentleman did not know very much about the subject, and that he suggested many things which, if carried out, would have resulted in the production of an engine which could not have worked; but he had an alternative proposition which would have worked.

Again, in the year 1861, the matter was revived by Lenoir, and in the year 1865, by Hugon, both French inventors. Their engines obtained some considerable amount of success and notoriety, and many of them were made and used; but in the majority of cases they were discarded as wasteful and uncertain. The Institution of Civil Engineers, for example, erected a Lenoir in the year 1868, to work the ventilating fan, but after a short time they were compelled to abandon it and to substitute an hydraulic engine.

At the present time, as I have said, gas engines are a great commercial success, and they have become so by the attention given to small things, in popular estimation—to important things, in fact, with which, however, I must not trouble you. Messrs. Crossley Brothers, who have done so much to make the gas engine the commercial success that it is, inform me that they are prosecuting improvements in the direction of attention to detail, from which they are obtaining greatly improved results.

But, looking at the wonderful petroleum industry, and at the multifarious products which are obtained from the crude material, is it too much to say, that there is a future for motor engines, worked by the vapour of some of the more highly volatile of these products—true vapour—not a gas, but a condensable body, capable of being worked over and over again? Numbers of such engines, some of as much as 4 horse-power, made by Mr. Yarrow, are now running, and are apparently giving good results; certainly excellent results as regards the compactness and lightness of the machinery; for boat purposes they possess the great advantage of being rapidly under way. I have seen one go to work within two minutes of the striking of the match to light the burner.

Again, as we know, the vapour of this material has been used as a gas in gas engines, the motive power having been obtained by direct combustion.

Having regard to these considerations, was I wrong in predicting that the heat engine of the future will probably be one independent of the vapour of water? And, further, in these days of electrical advancement, is it too much to hope for the direct production of electricity from the combustion of fuel?

As the world has become familiar with prime movers, the desire for their employment has increased. Many a householder could find useful occupation for a prime mover of $\frac{1}{4}$ or $\frac{1}{2}$ horse-power, working one or two hours a day; but the economical establishment of a steam engine is not possible until houses of very large dimensions are reached, where space exists for the engine, and where, having regard to the amount of work to be done, the incidental expenses can be borne. Where this cannot be, either the prime mover, with the advantages of its use, must be given up as a thing to be wished for, but not to be procured, or recourse must be had to some other contrivance—say to the laying on of power, in some form or another, from a central source.

I have already incidentally touched upon one mode of doing this, namely, the employment of illuminating gas, as the working agent in the gas engine; but there are various other modes, possessing their respective merits and demerits—all ingenious, all involving science in their application, and all more or less in practical use—such as the laying-on of special high-pressure water, as is now being extensively practised in London, in Hull, and elsewhere. Water at 700 pounds pressure per inch is a most convenient mode of laying on a large amount of power, through comparatively small pipes. Like electricity, where, when a high electro-motive force is used, a large amount of energy may be sent through a small conductor, so with water under high pressure the mains may be kept of reasonable diameters, without rendering them too small to transmit the power required through them.

Power is also transmitted by means of compressed air, an agent which, on the score of its ability to ventilate, and of its cleanliness, has much to recommend it. On the other hand, it is an agent which, having regard to the probability of the deposition of moisture in the form of "snow," requires to be worked with judgment.

(*To be concluded.*)

Obituary.

Notice has been received of the death of the following:—

On the 23rd of August, Mr. Alfred John Evans, Chemist and Druggist, Dorchester. Aged 66 years.

On the 24th of August, Mr. George Craig, Chemist and Druggist, Duncanston, Aberdeenshire. Aged 95 years.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Kirkby, Humphrey, Moore, Loveluck, T G. T.

WRIGHT

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IMPORTERS & DISTILLERS OF ESSENTIAL OILS,

Makers of Granular Effervescing Salts. Citrate Iron & Quinine.

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Fluid Ext. Cinchona
„ „ Ergot.
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Essential Oil Almonds, freed from Prussic Acid (Umney's).

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SOUTHWARK, LONDON.

UMNEY.

See Recommendatory Notice of Medical Press and Opinions of the leading Dermatologists.

WRIGHT'S

Added to water in the proportion of 5 per cent. anthrax. A 10 per cent. solution, acting for gelatin-pork or in the broth, did not commence acting for four hours, arrested future growth."

Extract from the Proceedings of the Royal Society of Edinburgh:—"Experiments on the Chief Disinfectants of Commerce, with a view of ascertaining their power of destroying the spores of the 'Anthrax Bacillus,' by a Medical Officer of Health and Public Analyst. **'LIQUOR CARBONIS DETERGENS.'**—This is a solution of certain coal tar products in spirit. It forms with water an emulsion. it had but feeble influence in preventing the subsequent growth of four hours, distinctly retarded growth; for the spores, whether in developing for 24 hours. Undiluted 'Liquor Carbonis Detergens,

Of all Druggists, Wholesale and Retail, throughout Great Britain, Ireland, and the Colonies.

LIQUOR

The *Practitioner*, of September, 1881:—"**Eczema** connected with varicose veins of the leg—also Pruritus Scroti, Labiorum, and Ani—is best relieved by weak tarry lotions, one of the best of which is *Wright's Liquor Carbonis Detergens.*"

P. McLeod, Colonel R.A., Inspector-General of Ordnance, Ordnance Office, Madras, writes Sept. 10th, 1887:—"I can certify that 'Liquor Carbonis Detergens' has cured me of a Psoriasis of 21 years, incurred in Burmah, after every effort of such an able skin doctor as Sir Erasmus Wilson had failed."

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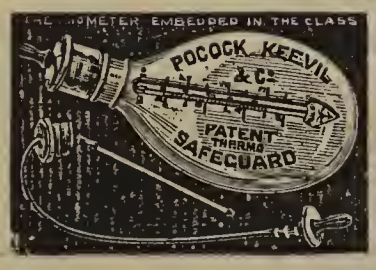

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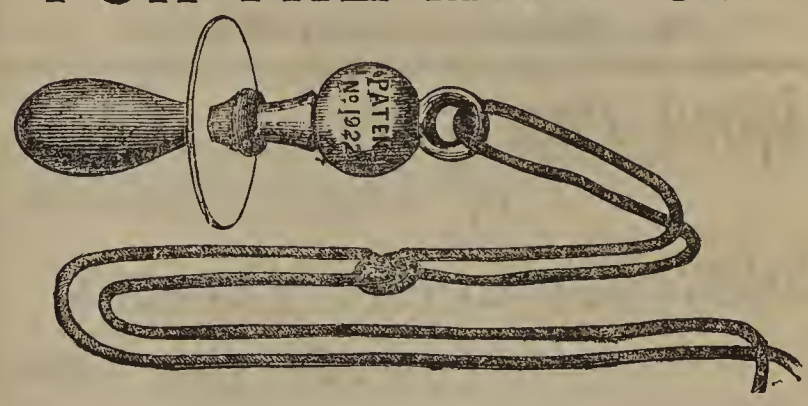

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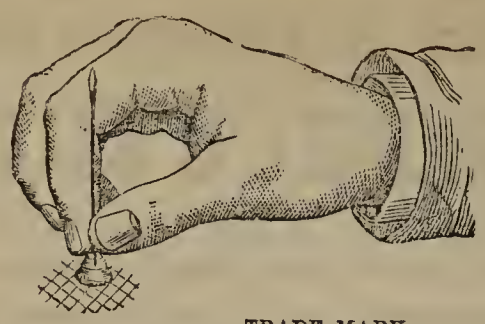

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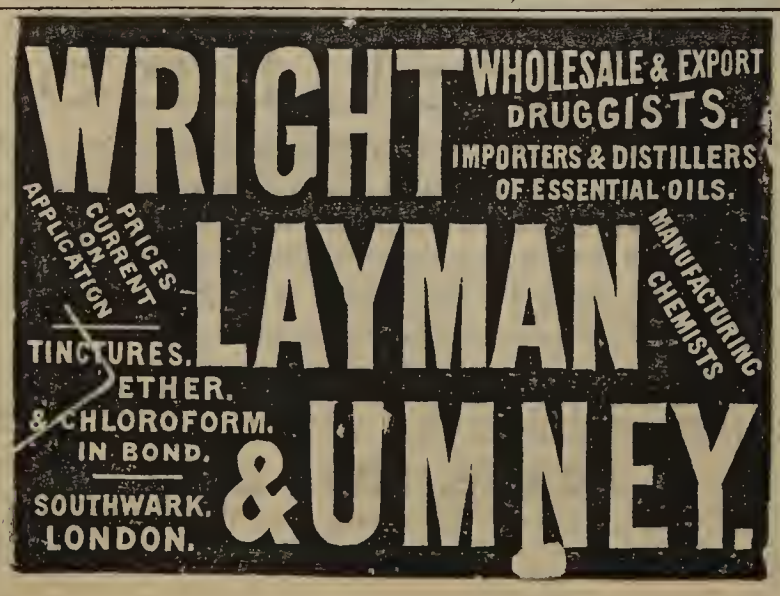

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The Classes at the College qualify for the Pharmaceutical Society's Examinations. Full particulars of the Courses will be forwarded on application.

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V. BUTLER SMITH, B.A., B.Sc.
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The Middlesex Hospital
MEDICAL SCHOOL.

The WINTER SESSION, 1888-9, will open on Monday, October 1st, at 3 p.m., when the Prizes awarded during the previous Winter and Summer Sessions will be distributed by Sir Arthur T. Watson, Bart, Q.C., and an Introductory Address will be delivered by W. Foster, Esq., M.A., F.C.S., followed by a reception in the School Buildings.

The ANNUAL DINNER of the Past and Present Students and their friends will take place the same evening at the Holborn Restaurant, at 7 o'clock, Dr. Sidney Coupland in the chair.

HOSPITAL STAFF.

Consulting Physicians—Dr. Henry Thompson, Dr. Goodfellow, Dr. Greenhow, F.R.S.
Physicians—Dr. Cayley, Dr. Sidney Coupland, Dr. Douglas Powell, Dr. D. W. Finlay.
Assistant Physicians—Dr. J. K. Fowler, Dr. C. Y. Biss, Dr. J. J. Pringle.
Obstetric Physician—Dr. Arthur W. Edis.
Consulting Physician to Skin Department—Dr. Robert Liveing.
Physician to Skin Department—Dr. J. J. Pringle.
Assistant Obstetric Physician—Dr. W. Duncan.
Consulting Surgeons—Mr. Shaw, Mr. Nunn.
Surgeons—Mr. Hulke, F.R.S., Mr. George Lawson, Mr. Henry Morris, Mr. Andrew Clark.
Assistant Surgeons—Mr. A. Pearce Gould, Mr. J. Bland Sutton.
Ophthalmic Surgeon—Mr. William Lang.
Aural Surgeon—Mr. Arthur Hensman.
Consulting Surgeon-Dentists—Sir John Tomes, F.R.S., Mr. J. S. Turner.
Dental Surgeon—Mr. Storer Bennett.
Assistant Dental Surgeon—Mr. W. Hern.
Curator of Museum and Pathologist—Mr. L. Hudson.
Registrars—Dr. W. Pasteur and Mr. W. Roger Williams, F.R.C.S.
Anæsthetists—Mr. G. Everitt Norton, Dr. McCausland.
Resident Medical Officer—Mr. E. A. Fardon.

LECTURERS.

Principles and Practice of Medicine—Dr. Cayley.
Principles and Practice of Surgery—Mr. Morris, M.A., M.B.
Practical Medicine and Therapeutics—Dr. Coupland, Dr. Douglas Powell.
Practical Surgery—Mr. Andrew Clark.
Physiology and General Anatomy—Mr. B. Thompson Lowne, F.L.S.
Descriptive and Surgical Anatomy—Mr. Arthur Hensman.
Chemistry and Practical Chemistry—Mr. W. Foster, M.A. Cantab.
Pathological Anatomy—Dr. J. K. Fowler, M.A.
Dissecting-room—Mr. Hensman, Mr. J. B. Sutton, Mr. C. G. Brodie, and Mr. W. H. Vickery.
Midwifery and Diseases of Women and Children—Dr. A. W. Edis.
Practical Midwifery—Dr. W. Duncan.
Materia Medica—Dr. Biss, M.A. Cantab.
Forensic Medicine—Dr. D. W. Finlay, B.A.
Botany—Dr. Biss, M.A. Cantab.
Practical Physiology and Histology—Mr. B. Thompson Lowne, F.L.S.
Public Health—Dr. D. W. Finlay, B.A.
Psychological Medicine—Dr W. J. Mickle.
Comparative Anatomy and Zoology—Mr. J. B. Sutton.
Dermatology—Dr. Liveing, M.A. Cantab.
Clinical Lectures on Medicine—Dr. Cayley, Dr. Coupland, Dr. Douglas Powell, Dr. D. W. Finlay, B.A.
Clinical Lectures on Surgery—Mr. Hulke, F.R.S., Mr. George Lawson, Mr. Morris.
Clinical Lectures on Diseases of Women and Children—Dr. Arthur W. Edis.
Clinical Lectures on Diseases of the Eye—Mr. William Lang.
Practical Demonstrations on Diseases of the Throat and Ear—Mr. Hensman.

The Hospital contains 310 beds. There are Special Departments for Cancer, Diseases of the Eye, Diseases of Women and Children, and Syphilis. In the Out-Patients' Department special days are devoted to Diseases of Children, the Throat and Ear, the Skin, and cases requiring Electrical treatment.

There are sixteen Resident Clinical Appointments open to Students of the Hospital annually.

SCHOLARSHIPS AND PRIZES.—Two Entrance Scholarships of the value of £100 and £60 respectively are awarded at the commencement of the Winter Session. Two Broderip Scholarships, of the value of £60 and £40 respectively, are also awarded every year for proficiency in clinical knowledge. The Hetley Prize, value £25, is awarded annually for proficiency in Clinical Medicine, Surgery, and Obstetrics. The Murray Scholarship in connexion with the University of Aberdeen will be awarded in May, 1889. The Lyell Medal, value 5 guineas, is awarded annually to third-year Students. An Exhibition, value 10 guineas, is open to Students at the end of their first year. The Governor's Prize of 20 guineas is annually given to the Student who, at the end of his third winter, shall pass the best Clinical Examination in the Out-Patient Department. Class Prizes are also given.

Clerkships and Dresserships are awarded without fee, and the Clerk and Dresser of the week dine at the board-room table, to have the opportunity of seeing cases that may be admitted during the evening.

MIDDLESEX HOSPITAL.—*Continued.*

The Tutors assist all General Students, especially those preparing for their Examinations, and thus the necessity of obtaining private instruction is obviated.

Inclusive Fee £100, or by three yearly instalments of £45, £40, and £25.

Some members of the staff receive Students as boarders. For particulars apply to the Dean.

Special arrangements are made for the convenience of Dental Students.

Preliminary Science Instruction. Arrangements have been made for Students desirous of undergoing a Course of Instruction in Science, such as that required for the Preliminary Scientific (M.B.) Examination of the University of London, to attend at the Normal School of Science, South Kensington.

The Residential College adjoining the Hospital provides accommodation for 30 students.

For further information apply at the Hospital to the Resident Medical Officer, or to

A. PEARCE GOULD, Dean.

St. Thomas's Hospital Medical School,
Albert Embankment, London, S.E.

The WINTER SESSION of 1888-89 will commence on Oct. 1, when an introductory address will be delivered by Dr. Cullingworth, at 3 p.m.

Two entrance science scholarships of 125 guineas and 60*l.* respectively, open to all first-year students, will be offered for competition. The examination will be held on the 26th, 27th, and 28th September, and the subjects will be chemistry and physics, with either botany or zoology, at the option of candidates.

Special classes are held throughout the year for the "Preliminary Scientific" and "Intermediate M.B." examinations of the University of London.

An additional Laboratory for the teaching of advanced Physiology has been recently provided.

All hospital appointments are open to students without extra charge.

Scholarships and money prizes of considerable value are awarded at the Sessional Examinations, as also several medals.

The fees may be paid in one sum or by instalments. Entries may be made to lectures or to hospital practice, and special arrangements are made for students entering in their second or subsequent years; also for dental students and for qualified practitioners.

Medical practitioners, clergymen, and private families residing in the neighbourhood receive students for residence and supervision, and a register of approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Medical Secretary, Mr. George Rendle.

E. NETTLESHIP, Dean.

The London Hospital and Medical
COLLEGE, Mile End, E.

The SESSION 1888-89 will commence on Monday, October 1st 1888. The new buildings, which were opened by T.R.H. the Prince and Princess of Wales on May 21st, 1887, afford more than double the accommodation which was provided formerly.

Four Entrance Scholarships, value £60, £40, £30, and £20, will be offered for competition at the end of September to new students. Fees for lectures and hospital practice, 90 guineas in one payment, or 100 guineas in three instalments. All resident and other hospital appointments are free, and the holders of all the resident appointments are provided with rooms and board entirely free of expense. The resident appointments consist of five house physiciancies, five house surgeoncies, one accoucheurship, one receiving-room officer, and one senior dresser to out-patients. Dressers and maternity pupils also reside in the Hospital. Special classes for the Preliminary Scientific and Intermediate M.B. Examinations of the University of London and for the Primary and Pass Examinations for the Fellowship of the Royal College of Surgeons of England are held throughout the year. Special entries may be made for medical and surgical practice. The London Hospital is now in direct communication by rail and tram with all parts of the metropolis, and the Metropolitan. Metropolitan District, East London, and South-Eastern Railways have stations within a minute's walk of the Hospital and College.

For prospectus and particulars apply, personally or by letter, to

MUNRO SCOTT, Warden.

The Mason College, Birmingham.
SESSION 1888-89.

FACULTIES OF ARTS AND SCIENCE.

The SESSION commences on Monday, 1st October, 1888.

Students under 16 are required to pass a preliminary examination.

Syllabuses, containing complete information as to the various courses of instruction, fees, lecture days and hours, entrance and other scholarships, prizes, &c., may be obtained from CORNISH BROS., New St., Birmingham, price 6d., by post 8d.

GEO. H. MORLEY, Secretary

THE EDINBURGH SCHOOL of PHARMACY & CHEMISTRY,

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The next Session of this School will be resumed on Monday, 1st October.

CHEMISTRY, Theoretical and Practical—J. R. PATERSON, B.Sc., F.C.S., *Lecturer, School of Medicine.*
MATERIA MEDICA AND PHARMACY—R. URQUHART, " " "
BOTANY—ALEX. JOHNSTONE, F.G.S., *Author of Botanical Notes.*

The Student's progress is tested from time to time by oral and practical examinations, and the Botanical Gardens are visited, the teacher giving demonstrations on the plants. Great additions have been made to the Museums, where Students can read with the various specimens. Certificates are awarded by competitive examinations at the close of each Session. Hitherto one Session of three months has been found to be sufficient where the candidate possessed previous knowledge in his subjects, but a Second Course can be taken at a reduced fee.

Note.—The Edinburgh Provident Dispensary is attached to this Institution, where upwards of 8,000 patients are prescribed for, and bo 15,000 Prescriptions are Dispensed annually. Pupils attending this School have, therefore, exceptional advantages in Dispensing

The opening address will be delivered by Mr. PATERSON, B.Sc., F.C.S.

For particulars, apply to the SECRETARY.

TO PHARMACEUTICAL STUDENTS.

The next COMPETITION for the

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Will be held on FRIDAY, SEPT. 28th next.

The holder is entitled to FREE EDUCATION in all the Branches for the Minor Examination.

For all particulars apply to Secretary, Edinburgh School of Pharmacy, Marshall Street, Nicolson Square Edinburgh.

Royal (Dick) Veterinary College,

8, Clyde Street, Edinburgh.

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The 66th SESSION BEGINS 1st OCTOBER, 1888.

For full particulars apply to Principal WALLEY.

NEW VETERINARY COLLEGE,

EDINBURGH.

W. WILLIAMS, F.R.S.E., &c., *Principal.*

WINTER SESSION will commence on WEDNESDAY, 3rd October. PROSPECTUS ON APPLICATION.

PRELIMINARY & MINOR.

ALL Students who are preparing should send for particulars of a method of study which will enable them to pass with ease. Enclose stamped envelope to Mr. J. TULLY (Hills Prizeman), Chemist, Hastings. Established 1872. References to past and present Pupils. 35 Pupils passed the last Examinations.

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PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 3d. Cæsar Simplified, 1s. Knotty Points in Latin Grammar, 1s. 6d. MINOR.—Equations Simplified, 1s. Illegible Autographic Prescriptions, 1s. Notes on Dispensing, 1s. Prescriptions given at the Minor, 6d. CHEMIST, care of Mr. J. Edwards, Wye, Kent.

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EVENING CLASSES

For Minor Students will be commenced on Monday next, Sept. 10th, at 7.30, and will be continued on Wednesday and Friday Evenings at the same time.

The next Course of Lectures and Classes for the December and February Examinations will begin on Thursday, October 25th. Fees to December, 6 guineas ; to February, 10 guineas.

For Prospectus, apply to

Mr. JOHN WOODLAND, 173, Marylebone Road, N.W.

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Estab. 1882.

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Day and Evening Classes at moderate fees.

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Practical Chemistry	Mr. H. J. SALMON, A.I.C.
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Pharmacy	Mr MAURICE WILLIAMS.

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WESTMINSTER COLLEGE

TRINITY SQUARE, BORO', LONDON, S.E.

The Sixteenth Session of this School was commenced on Wednesday, September 5th, when the Inaugural Address and Introductory Lecture were delivered by Mr. WILLS, Principal.

The following Prizes were Awarded to the successful Students at the competitions of last Session :—

Senior Chemistry.

Silver Medals.

DOUGLAS, J. W.
MARSHALL, W.
WESTON, G.

Bronze Medals.

MASTERS, H.
WILCOCK, F. A.

Certificates of Honour.

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COOPER, C. T.
DANIEL, D.
GOODMAN, J.
GLOVER, T. J.
GREENHALGH, T. E.
NORTHWOOD, H. G.
SURFLEET, A. G.
WANSBROUGH, E.G.L

Junior Chemistry.

Bronze Medals.

LANCE, W. D.
OGLE, J. H.
PAIN, P.

Certificates of Honour.

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FRANKLIN, A. J.
DAVISON, J. R.
HATHAWAY, F. J. W.
HEAD, G.
HEARNSHAW, A. D.
HORSLEY, E. S.
HOWELL, A.
LONGDIN, T. W.
MASTERMAN, F. J.
PEPPERDINE, H.
ROBSON, T. W.
RYALL, F. J.
SAPWELL, C.
SMART, T. W.
TURNBULL, H. J.

Materia Medica.

Bronze Medals.

COOPER, J. J.
REID, D.
SURFLEET, A. G.

Certificates of Honour.

ARDEN, L
BEAUCHAMP, F. C.
BRENT, A.
BUTLER, E. S.
EVANS, J.
GOOLD, B.
HAIGH, W.
HALL, A. J.
MORGAN, E.
NORTON, E. T.
PLEWS, H. W.
PORRITT, G. F.
PRICE, J.
SLINN, H. E.
STAPLETON, F. W.
SUFFIELD, M. O.
WATKINSON, E. W.
WILLSHER, C. G.
WILLOWS, H. G.

Botany.

Bronze Medals.

BEAUCHAMP, F. C.
GRAYSON, J. H.
SPURGE, E. C.

Certificates of Honour.

ATKIN, R. H. A.
CHATTERTON, B.
CHURCH, E. H.
HARPER, E. W.
HEALE, T. A. O.
HOGG, J. A.
JAMES, W. M.
MELTON, J. A.
OGLE, J. H.
PRIOR, J.
SMITH, H.
WILLOWS, H. G.

The next two courses of Lectures and Classes will commence on October 23rd and January 1st, entries for which can now be received.

Students can enter at any time, but are advised to commence their studies at the beginning of a course.

During the past Session, **14** Students passed the Preliminary, **140** the Minor and **12** the Major Examinations of the Pharmaceutical Society.

At the last Pharmaceutical Examinations, **3** Major Candidates from this school presented themselves, **6** passed. The following **35** Minor Students were also successful

MAJOR.

CARTER, B.
EVANS, J.
FORSTER, J. B.
HEATON, S. W.
WANT, W. P.
WRIGHT, J.

MINOR.

ARDEN, L.
BAKER, H. W.
BELL, J. H.
BROOKS, J.
BROWN, L.
DOUGLAS, J. W.
EYNON, C. J.
GLOVER, F. J.
GOOLD, B.
GRIFFITHS, H. T.
HATHAWAY, F. H.W.
HALL, A. J.
HITCHMAN, W.
HORSLEY, E. S.
JONES, J.
JONES, LL.
LANCE, W. D.
LONGDIN, T. W.
MASTERS, H.
MORRELL, C.
NORTHWOOD, H. G.
NORTON, T. E.
WILKINSON, T.
OGLE, J. H.
PATCHETT, J.
PEPPERDINE, H.
REID, D.
RUTHERFORD, W.
STARK, J.
TUDOR, W.
TURNBULL, H. J.
TURNER, W. H.
WEST, G. W.
WHITWORTH, J. W
WILLOWS, H. G.

For Prospectus and other information, apply to Messrs. WILLS & WOOTTON, TRINITY SQ., BORO', LONDON.

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Established 1877. *Manchester* 1882.

During the year ending at the July examinations, FORTY Students from this School passed the Minor, and several of them were commended by the examiners, both in London and Edinburgh, for the manner in which their work was done, a proof that Mr. Turner's Class System is useful in ensuring a thorough and practical knowledge of the subjects taught, as well as of obtaining a pass.

Full particulars of the Classes sent on application.

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Materia Medica and Pharmacy,
MR. DODD, F.C.S.

Analytical Chemistry,
MR. DE KONINGH, F.I.C., F.C.S.

Classics, and Mathematics and Mechanics,
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All numbers refer to Maw's Illustrated List.—8ft. wall-case, A 88, £27; upright case, fig. A 4, £5 10s.; plate-glass shelves; show stand, 3ft. 6in. long, 60s.; 14ft. mahogany-fronted counter, £9; 4ft. plate-glass case-fronted ditto, 70s.; 3ft. plate-glass counter-case, A 17, 55s.; 6ft. 9in. long ditto ditto, 20in. wide, £6 10s.; 3ft. bevel-fronted ditto, 35s.; 4ft. plate-glass ditto, as Maw's A 13, 50s.; 5ft. 6in. ditto ditto, 23in. wide, £5 10s.; 5ft. 6in. ditto ditto, as fig. A 3, 60s.—E. NATALI, 207, Old Street, London, E.C.

Plate-glass sponge-cases, fig. A 41, 65s.; ditto, ditto, as fig. A 43, 95s.; show-steps, A 37, 50s., as fig. A 39, 15s.; desk and glass case, A 31, 60s.; a ditto, ditto, 50s.; a number of dispensing screens, from 5ft. to 8ft. long, glass case at each side, with silvered plate-glass in centre and marble slab in front, tablets on top of cases and shelves at back for dispensing bottles, very elaborate, from £6 10s.; a 3ft. ditto, as fig. A 54, 45s.; 3ft. 6in. ditto, 55s.; 4ft. ditto, ditto, 60s.; 4ft. 10in. ditto, 70s.; 5ft., as fig. A 55, 95s.; 6ft. ditto, £5 10s.; 6ft. 6in. ditto, £6; 7ft. ditto, £6 10s.; and a quantity of other screens very cheap; several pair specie jars, royal arms, equal to new, from 24in., price £4; carboys, 16 gallons, with mahogany stands; 3 4-gallon carboys, 10s. each; dome-covered pink ointment jars, gold labelled, any names, 3s. 9d. each; a lot of second-hand green, blue, 3 and 4 lb.; ½-gall. displacement apparatus, fig. 53; black store bottles, with japanned caps, 1s. 3d. each.—E. NATALI, 207, Old Street, London, E.C.

A number of flat glass cases, various sizes, from 2ft. 6in. to 6ft. long, as fig. 2, to open at back, to be sold very cheap to make room; also a number as fig. 3—2ft. long, 30s.; 2ft. 6in. long, 32s.; 2ft. 8in. long, 35s.; 3ft. long, 40s.; 3ft. 6in. long, 45s.; as fig. A 8, 5ft. long, 95s.; 6ft. long, £5 10s.; as fig. A 15, 8ft. long, £7; 5ft. long, £4 10s.; as fig. A 16, 3ft. long, 55s.; 3ft. 6in. long, 60s.; 3ft. 9in. long, 65s.; 4ft. long, 70s.; as fig. A 17, 4ft. long, 75s.; as fig. A 18, 5ft. long, £5; 6ft. long, £5 10s.; tooth brush cases, as fig. A 9, 35s.; as fig. A 10, 50s.—E. NATALI, 207, Old Street, London, E.C.

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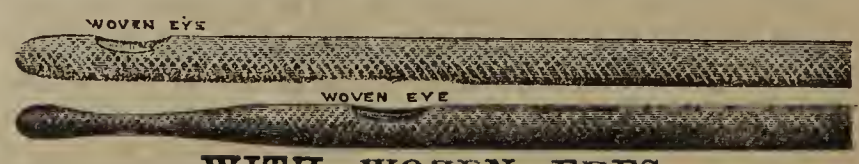

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5. LIVERPOOL ...	,,	850.	,,	50.	,,	600.
6. BIRKENHEAD	,,	760.	,,	60.	,,	250.
7. ESSEX ...	,,	600.	,,	22.	,,	400.
8. LINCOLNSHIRE	,,	500.	,,	45.	,,	250.
9. ESSEX ...	,,	450.	,,	50.	,,	375.
10. LONDON, N...	,,	400.	,,	45.	,,	187.
11. NOTTINGHAM	,,	400.	,,	25.	,,	130.
12. HANLEY ...	,,	360.	,,	30.	,,	250.
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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 951.] SATURDAY, SEPTEMBER 15, 1888. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

SPECIAL NOTICE.

The Society's Libraries and Museums in London and Edinburgh will not be open in the evening during August and September.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society, of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

There are at present *forty-nine* annuitants, receiving £1670 per annum, and casual relief is also granted, amounting in 1887 to nearly £500. The total expenditure in 1887 was £2375.

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Bristol	Dundee	Leeds	Peterborough
Cambridge	Edinburgh	Lincoln	Sheffield
Canterbury	Exeter	Liverpool	Shrewsbury
Cardiff	Glasgow	London	Southampton
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Carmarthen	Hull	Newcastle	Worcester
Carnarvon		Northampton	York

* A Certificate of having passed any of the examinations approved by the Council (a list of which may be obtained from the Registrar) will be accepted in lieu of this Examination, provided Latin, Arithmetic, and English were included in the subjects of the Examination for which the Certificate was granted.

The Certificate must be forwarded to the Registrar, with the fee of Two Guineas, for the approval of the Board of Examiners, and must be so approved before the Candidate is eligible to enter his name for the Minor Examination.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

At 8 p.m. on Wednesday, October 3rd, the School Prizes will be distributed and an Address to the Students will be delivered by Sir HENRY E. ROSCOE, *M.P., LL.D., F.R.S.*

All students and friends, ladies as well as gentlemen, are invited to be present.

The Forty-seventh Session will commence on Monday, October 1st, 1888.

CHEMISTRY

BY PROFESSOR WYNDHAM DUNSTAN.

The Lectures will begin on Monday, October 1st, at 9 a.m., and be continued on the first three days of each week.

PRACTICAL CHEMISTRY

BY PROFESSOR ATTFIELD.

The Laboratories will re-open on Monday, October 1st. Instruction in Practical Chemistry may be had daily throughout the Session, between 10 a.m. and 5 p.m. Entries may be made for various periods.

BOTANY

BY PROFESSOR GREEN.

The Lectures will begin on Friday, October 5th, at 9 a.m., and be continued on the last two days of each week.

MATERIA MEDICA.

Demonstrations will be given by Mr. E. M. HOLMES, the Curator of the Museum, on Thursdays, at 10 a.m., commencing on October 4th.

PHARMACY AND PRACTICAL PHARMACY.

Lectures and Demonstrations will be given every week by Mr. JOSEPH INCE, on Tuesdays, Thursdays and Fridays, at 5 p.m., commencing on October 2nd. Laboratory work in Practical Pharmacy will be carried on from 3 to 6 p.m. on Mondays and Wednesdays.

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2.—That letters addressed to initials or to fictitious names at a Post Office are not delivered by the Post Office Authorities, but are at once sent back by them to the writers.

3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM. JOURN.**" and must be sent only to J. & A. CHURCHILL, 11, New Burlington Street, London, W.
Telegraphic Address, "Churchill, Publishers, London."

N.B.—The Journal is supplied from the publishing office post free to any part of the United Kingdom on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad (excepting India and China), 22*s.*; India and China, *viâ* Brindisi, 24*s.* per annum.

Payment may be made either by **Cash** in a Registered Letter, by **Postal Order**, by **Cheque** crossed London and County Bank, or by **Money Order**, payable at Regent Street, W., to J. & A. CHURCHILL. *Postage Stamps for any amount above Ninepence cannot be received in payment.*

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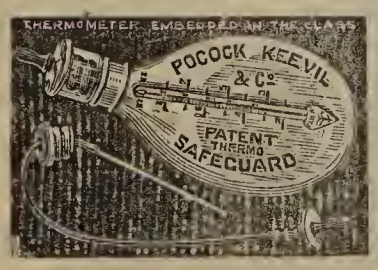

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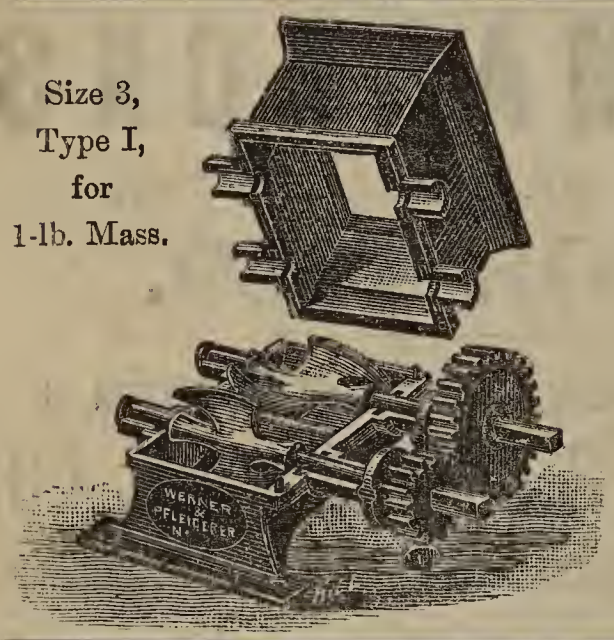

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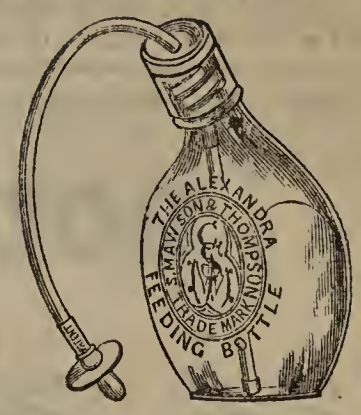

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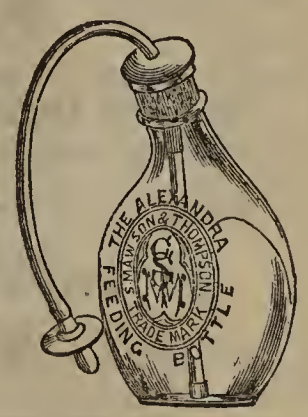

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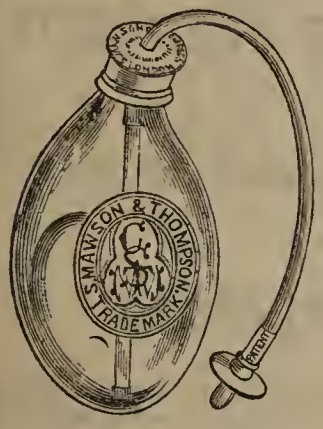

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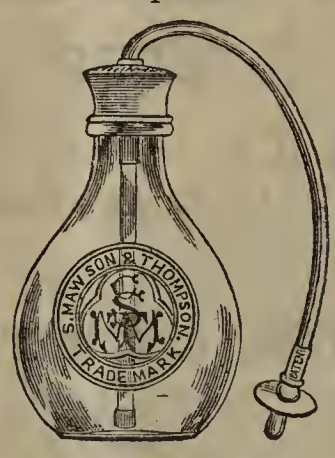

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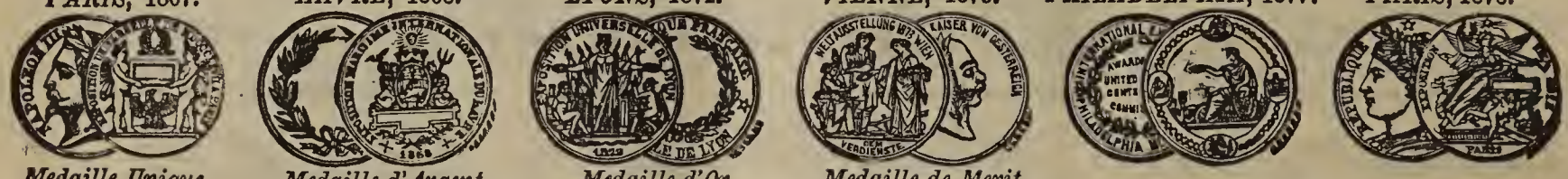

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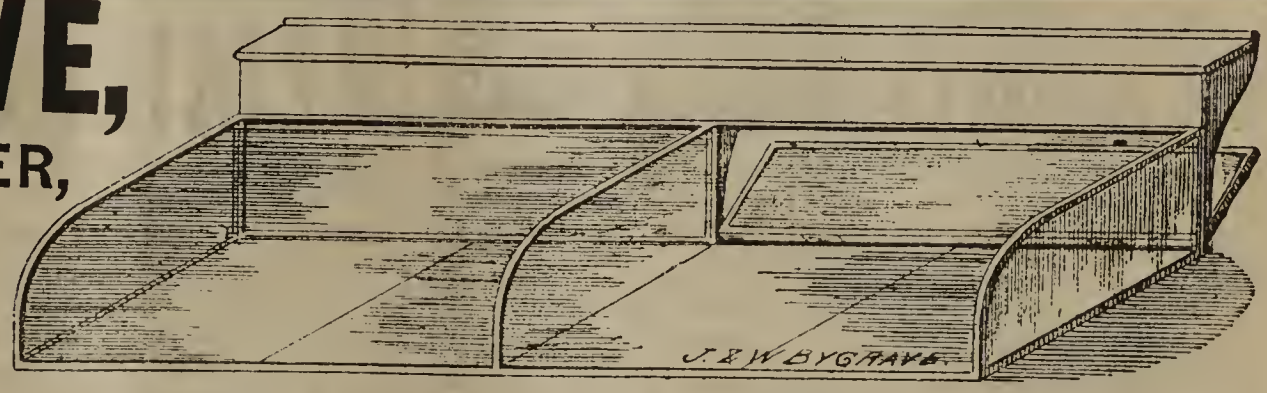

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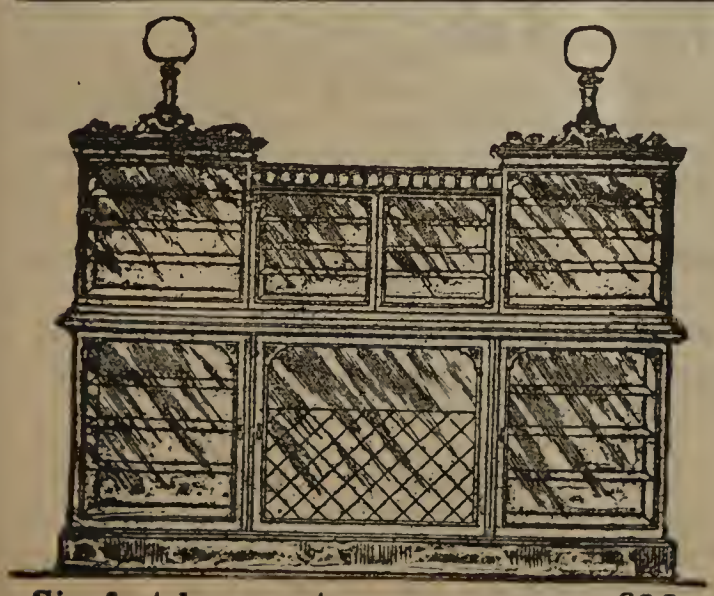

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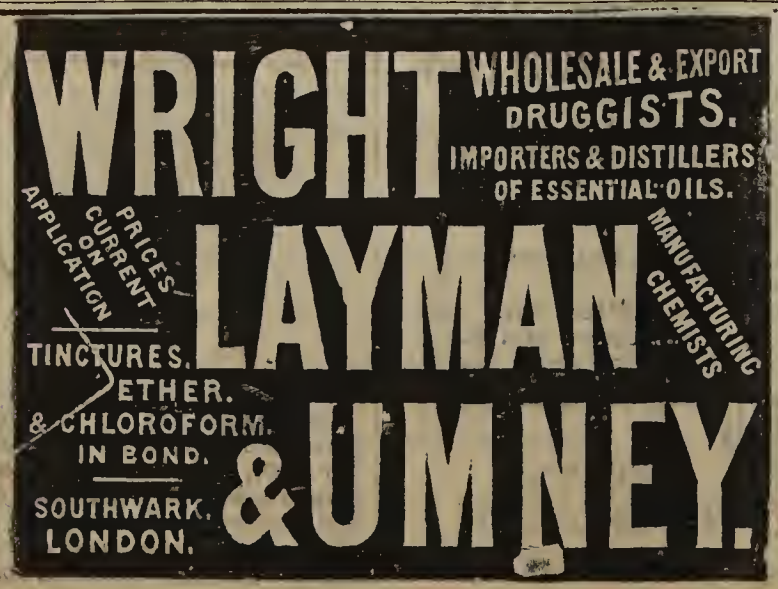

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Contrexeville "Le Cler"	8/	..	**50**	**32/**	..	..
Do. "Pavilion"	9/	..	50	35/	..	..
Ems	7/	..	50	28/	..	..
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Homburg	10/	..	50	38/	..	..
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Johannis-Brunnen	6/	5/	50	23/	100	36/
Kissengen	11/	..	50	45/	..	..
Kreuznach	11/	..	50	45/	..	..
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Orezza	12/	..	**30**	**23/**	..	..
Pullna	12/	8/	**40**	**36**	**40**	**25/**
Roisdorf	6/	..	50	25/	..	..
Rosbach	6/	5/	**50**	**24/**	**100**	**36/**
Royat	9/	..	**50**	**34**	..	..
Rubinat	15/	..	**25**	**30/**	..	..
St. Boës	12/	..	50	48/	..	..
St. Galmier Badoit (Still)	6/	..	**50**	**22/**	..	..
Do. Noël (Sparkling)	6/	4/	**60**	**26/**	100	34/
St Moritz	12/	..	**50**	**48/**	..	..
Salvator	..	9/	..	..	50	36/
Schwalbach	8/	6/	**50**	**30/**	50	24/
Selters	6/	4/	**50**	**23/**	**50**	**16/**
Sulis	6/	5/	**50**	**23/**	100	36/
Tarasp	12/	..	**30**	**28/**	..	..
Taunus	5/6	4/6	**50**	**22/**	100	32/
Vals (Société Springs)	8/6	..	**50**	**32/**	..	..
Vichy (State Springs)	8/6	7/6	**50**	**32/**	**50**	**28/**
Victoria Ofner	14/	10/	**25**	**27/**	**50**	**38/**
Wildungen	10/	..	**50**	**40/**	..	..

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	s.	d.		
To sell at ...	1	0	...	2 patterns.
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„ ...	2	0	...	2 „
„ ...	2	6	...	4 „
„ ...	3	0	...	2 „

	s.	d.		
To sell at ...	4	0	...	4 patterns.
„ ...	5	0	...	4 „
„ ...	6	0	...	3 „
„ ...	7	6	...	4 „
„ ...	10	6	...	2 „

Each Respirator is neatly put up in a box, and is priced so as to yield half profit.

The following assortment contains the leading patterns:—

No. 1 *Case* (Fig. 446).

Two each of Nos. 1, 2, 3, 4,
One „ „ 5, 8, 10, 12, 14, 15, 17, 18, 20, 21, 22.

Producing retail			£4 5 6
Cost	£2	6	8
Less 10 per cent.	0	4	8
			2 2 0
Showing a PROFIT of			£2 3 6

No. 2 *Case* (Fig. 447).

Six each of Nos. 1, 2, 3, 4,
Two „ „ 5, 6, 8, 10, 12, 17, 18, 21, 22,
One „ „ 7, 9, 11, 13, 14, 15, 16, 20, 23, 25.

Producing retail			£10 18 6
Cost	£5	18	0
Less 10 per cent.	0	11	10
			5 6 2
Showing a PROFIT of			£5 12 4

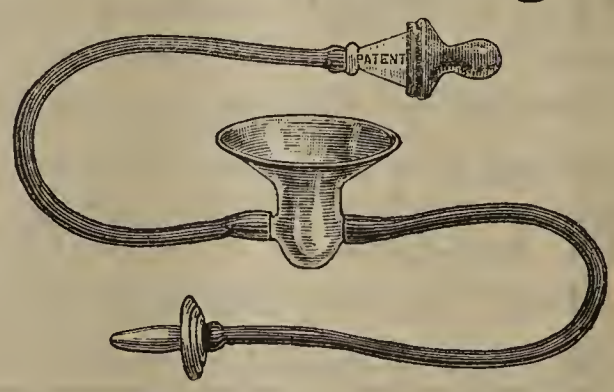
With orders amounting to £2 net, we will send a Mahogany Glass-top Counter Case, with hinged lid, FREE OF CHARGE; and with orders amounting to £5 net, a handsome Mahogany Counter Case (size 22 by 12 by 4), with sloping top, hinged back, and sliding tray.

THE "MAMMA"

Combined Breast Reliever and Siphon Nipple Shield, with Suckling Tube.

Per doz.

8s.



Per doz.

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REDUCED PRICES.

This little syringe is introduced for the administration of the glycerine enemata recently recommended for obstinate constipation. The article is well made of vulcanite, and the piston is of the approved hour-glass leather form, obviating the inconvenience generally attendant upon the common variety packed with thread. Pewter, per doz., 8s. 6d.; Vulcanite, per doz., 18s. Vulcanite and glass, per doz., 18s.

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LABORATORY NOTES.

BY W. H. SYMONS.

Note I. Adulteration of Ceresine.—Ceresine is a crude form of paraffin wax very much resembling beeswax in appearance, and sometimes employed as a substitute for that material. It is also largely used in conjunction with paraffin oil for the production of soft paraffin, and when of good quality, yields a preparation which as an elegant basis for ointments, where absorption by the skin is not required, compares favourably with any yet introduced.

In manufacturing "soft paraffin" artificially one might imagine that the lower the melting point of the wax employed the better would it combine with the oil, but in practice it is found preferable to use a wax of high melting point. A less quantity answers the purpose, and more perfect solution results. Hence a demand for a paraffin of high melting point exists. In examining a recent sample, by the methods described below, it was found to behave in such a peculiar manner that it was impossible to assign any definite temperature as the melting point. On heating a larger quantity a distinct odour of resin was perceptible. It was further found that a sample heated in a water-oven for several hours and slowly cooled separated into two layers, one of which consisted for the most part of rosin.

In order to estimate approximately the extent of the adulteration, a weighed quantity was boiled in a flask furnished with an upright condenser with about twenty times its weight of 95 per cent. alcohol, being well agitated while the ceresine was fluid. The mixture was allowed to stand over night at normal temperature and then cooled to zero for an hour. The separated paraffin was filtered off and washed with cold alcohol until the filtrate measured thirty times the weight of the original ceresine. It was then evaporated to dryness and weighed. The residue, which had all the characters of rosin, amounted to 53·6 per cent. To test the accuracy of the process, 5·12 gram pure ceresine was mixed with 4·46 gram rosin by melting them together, this yielding a mixture containing 46·6 per cent. rosin. A portion weighing 1·380 gram treated as above yielded 0·661 gram alcoholic extract; deducting 0·010 gram due to paraffin dissolved, as found by blank experiment, we have 47·2 per cent. rosin indicated.

The following table gives general results :—

	Sp. gr.	M. p.	Alcoholic extract.
Pure ceresine No. 1 .	0·917	77° C.	0·8
Pure ceresine No. 2 .	0·914	69° C.	1·4
Condemned ceresine .	1·008	?	53·6
Mixture	·982	?	47·9
Rosin	1·080	100° C.	100·0

Note II. The Determination of Melting Points.—For technical purposes, in the case of most fats, it is sufficient to dip a thermometer in the melted substance, and then, rotating the thermometer in a horizontal position, to use the bulb as a mirror, and note the temperature at which it is no longer possible to see one's image clearly. Or we may observe the temperature at which the drop adheres to the bulb and rotates with it. If the thermometer is fitted with a cork to a test-tube the bulb may be protected from currents of air and the indications rendered more delicate. This process really determines the solidifying point, and where that differs considerably from the melting point, as in the case of cacao butter, we may ascertain the latter by holding the arrangement at a suitable distance over a Bunsen flame. The bulb of the thermometer thus becomes a hot stage surrounded by an air-bath. The temperature is completely under control, and may be regulated to a fraction of a degree over a very wide range. I find that results by this method are rather lower than those usually accepted as correct. For example, pure stearic acid melts when the thermometer indicates 68·5° C.; its melting point is 69·2° C. Benzene, several times recrystallized, melts on the bulb at 3·9° C.; its melting point is stated to be 4·5° C. The thermometers used were of known accuracy.

In taking the melting points of the substances mentioned in note 1, the above method was supplemented by the following modification of the process described in the Pharmacopœia.

A piece of thin spindle tubing is enlarged at one end and drawn out and bent round U-shaped at the other, see fig. 1. A small portion of the substance

Fig. 1.

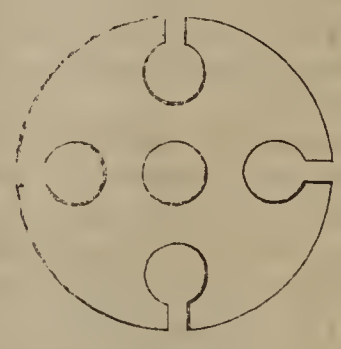

Fig. 2.

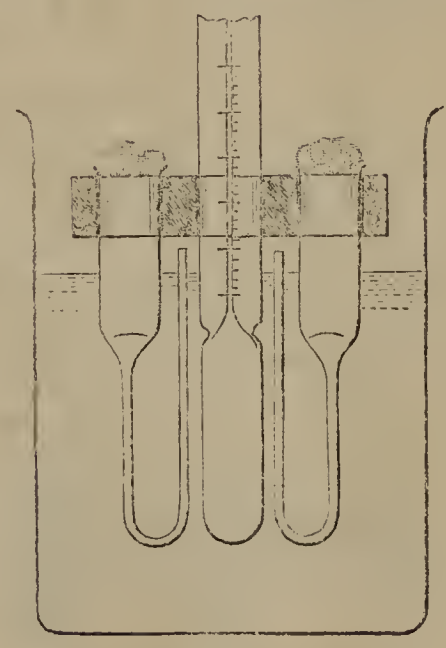

Fig 3.

to be examined is placed in the wide end, which is afterwards loosely plugged with cotton-wool. Two or more such tubes can be attached to a thermometer by means of a cork cut as shown in fig. 2. The central hole takes the thermometer, and grips it sufficiently tightly to remain at any height it may be placed. The tubes, after being inserted, are twisted round so that the capillary tubes almost touch the bulb of the thermometer. The arrangement is then placed in a double water-bath, the inner vessel consisting of a small beaker partially filled with water, the outer vessel, not shown in the drawing, being a large beaker quite full of water. The water should have been recently boiled to remove air. The bath is heated until the substances

melt, the source of heat is then removed, and while the bulb of the thermometer remains in the liquid the cork is shifted upwards, so as to lift the tubes out of the water. The substances immediately solidify. When the temperature has fallen 5° they are re-immersed in the bath and the effect observed. The operation is repeated until the approximate melting point is ascertained. Then the bath being again heated, more careful observations are made at every 0·5°, or oftener. By using a falling temperature convection currents are in a great measure avoided.

For bodies which melt between 100° C. and 150° C. sulphuric acid may be used instead of water, and above this temperature fusible metal can be employed.

Neither this nor any other process with which I am acquainted gives absolutely satisfactory and comparable results when used with a substance, which, like "paraffin molle" of the Pharmacopœia, consists of a mixture of substances of varying melting points, for such a body when heated to a temperature above its reputed melting point, and while the mass as a whole is undoubtedly fluid, still contains solid particles. On the other hand a paraffin wax, having a true melting point several degrees below that given for soft paraffin, is quite solid at normal temperatures.

In comparing melting points of such substances it is sometimes useful to partially fill two similar tubes, and place above the fats like quantities of mercury, noting the temperature at which the mercury forces the fats out of the tubes.

Note III. Specific Gravity of Insoluble Substances.—The process usually described in text books is

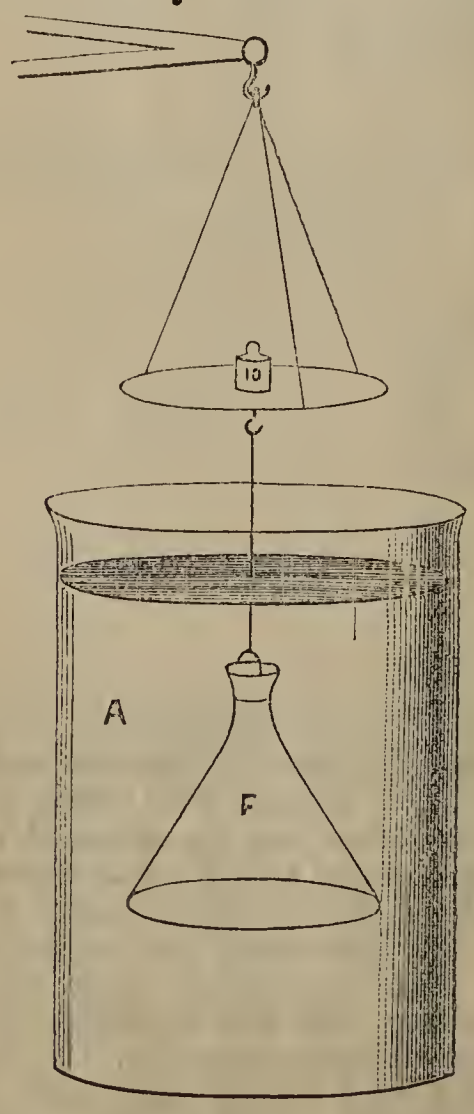

Fig. 4.

unnecessarily complicated. If a sufficient supply of material is at hand, a block may be cut of suitable size and shape (4×4×1 c.m.) to be held in a wire clip, such as is used for holding watch glasses together. In the case of wax it is best to cut with a hot knife so as to avoid fissures. The substance is weighed first in air and then under water with the clip, which has been previously counterpoised, while suspended by a fine wire or hair, in water: the temperature is noted and we then have all the required data. With smaller quantities, when the substances are lighter than water, the plan I adopt is as follows:—A small funnel, F, is hung by a fine platinum wire to the specific gravity pan of a balance and counterpoised when floating in water, together with a 10 gram weight placed on the pan. If the substance to be examined is wax, its surface is rendered smooth by holding for a few seconds in a Bunsen flame. The 10 gram weight being removed the wax is placed in its stead and weights added until equilibrium is restored. The difference between the sum of these weights and 10 grams is the weight of the substance in air. The wax is then held under water in the beaker A, and the air bubbles removed by means of a camel hair pencil, an operation comparatively easy with a smooth surface; it is then slipped under the funnel F, which is again counterpoised. The excess of weight over 10 grams added to the weight in air gives the loss of weight in water, and the specific gravity is deduced in the usual way.

Note IV. Constant Level for Water-Bath.—Gay Lussac's arrangement on the principle of a "Marriotte's Bottle," for keeping the liquid in a filter at a constant level, answers equally well for a water-bath or a water-oven, and I have so used it for several years.

The arrangement consists of a bottle, for convenience a "Winchester quart," fitted with a rubber stopper, through which pass tubes, as shown in the figure. A is a long straight tube open at both ends;

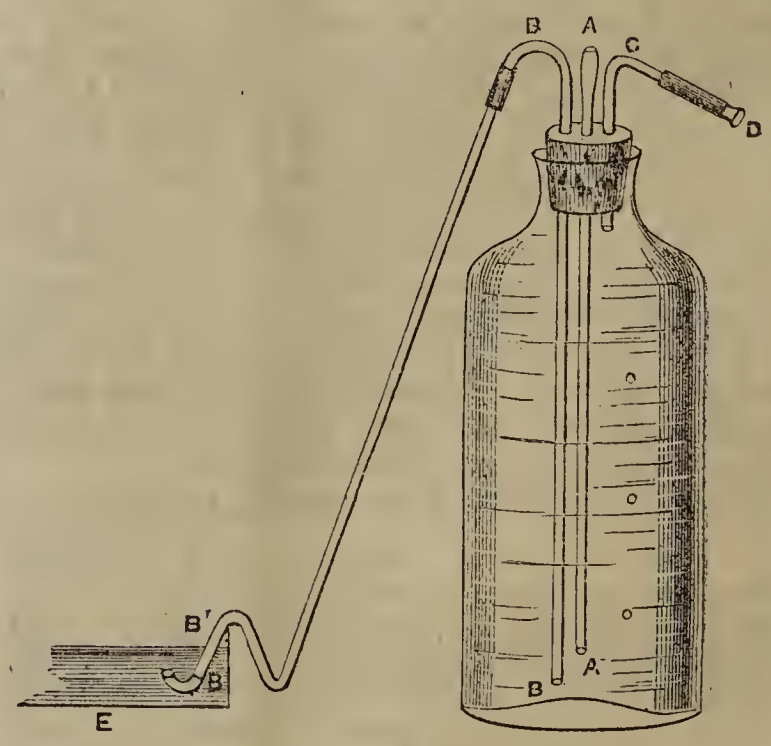

Fig. 5.

it passes nearly to the bottom of the vessel. B is a bent tube, also open, and terminates below A; it is intended to act as a syphon. At B′ it is bent thrice upon itself in order to prevent the heating of the column of water by convection, but when used for a water-oven the double bend is dispensed with. Tube C terminates inside the cork, and is opened or closed as necessity requires by means of the caoutchouc tube and glass rod D. The bottle is filled through A by means of a funnel, the plug D being removed whilst filling; when the plug

is replaced any further quantity of water added will run out through B, and when the supply of water through the funnel ceases, it will continue to flow until the level of the liquid in the water-bath E is in the same horizontal plane as the bottom of tube A. If more water be added directly to the bath the water will rise in tube A; it therefore answers as a gauge of the level in the communicating vessel.

Note V. Storing Small Quantities of Gas.—The bottle above described answers admirably for collecting and storing small quantities of gas. The bottle being full of liquid, C is connected with gas supply, A is closed, B is joined to the tube A of another similar bottle in which C is open; or B may be attached direct to the waste pipe: as soon as the bottle is nearly full of gas the tube C is closed. When the gas is required for use it may be driven out through C at any required pressure by connecting A with the syphon tube B of a second bottle placed at a suitable elevation, the tube B of the first bottle being closed; or liquid may be poured into A through a funnel. I have found the bottles useful for containing oxygen, which is frequently required to facilitate the complete and rapid combustion of carbonaceous matter. Ammonia may be stored over petroleum oil, which only dissolves about one and a half times its volume of this gas.

Note VI. Partial Vacuum for Desiccator, Percolator, etc.—A gallon tin is fitted with a rubber stopper, through which passes a glass tube bent at right angles and attached to a rubber tube which can be closed by a screw pinchcock. About half a pint of water is placed in the tin and boiled until the air has been removed, that is, until the steam is wholly condensed when passed into cold water. The source of heat is then withdrawn and the rubber tube closed with the pinchcock. The tin is cooled by placing in cold water. The rubber tube is now attached to the vessel to be exhausted and the cocks opened. If the vessel be about a litre in capacity, three-fourths of the air will be taken from it, and if the operation be repeated a second time the quantity may be further reduced to one-sixteenth of an atmosphere, and this for most practical purposes is a vacuum.

I find that an ordinary gallon tin will bear the required pressure, that a two gallon tin of usual thickness will not do so: neither will an essence of lemon copper, which is generally so useful for laboratory purposes, answer in this case; but its failure in this respect may be turned to account as a lecture experiment to illustrate the great force of atmospheric pressure.

Note VII. Improvement in the Taps of Separatory Funnels.—In small separatory funnels the diameter

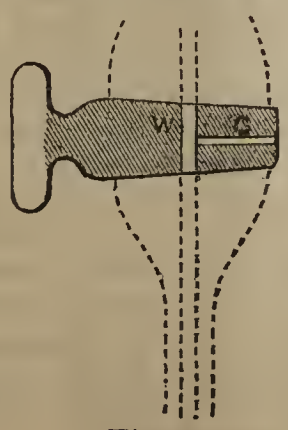

Fig. 6.

of the tube below the tap is often so small that a column of aqueous liquid is tenaciously retained in it, but when ether passes the tap its cohesive force is so small that the column breaks and carries with it a portion of the ethereal liquid which it may be desired to retain. If, however, a groove G be filed in the plug at right angles to the "way" W, air is admitted to the tube below whenever the tap is shut, and so any liquid it may contain runs out. The use of the tap is in other respects in no ways interfered with, provided it is always turned off in the right direction.

10, *Ascham Street, N. W.*

ELIXIR OF BLACK CURRANT*

BY L. A. CREUSE.

Some remarks made at a recent meeting of the Paris Society of Pharmacy have reminded me of experiments which I made a few years since, with a new base for elixirs. There are already several such preparations used more or less extensively as vehicles for various medicines, and no doubt some are very good for the purpose of disguising the taste of bitter principles, but they are not equally efficacious with acid and saline compounds. This class of medicaments appear to be more readily acceptable to the stomach when dissolved in a preparation from black currant, well-known in France, but so far only used as a popular cordial under the name of *cassis*. As black currants, like other fruits of the same family, are naturally somewhat acid, their taste readily agrees with sour medicines. They grow, besides, in many parts of the United States, and are easily procurable; they are found, for instance, during the currant season in abundance in the New York markets. No difficulty, therefore, will be met with in making the preparation in question. The following formulas may be recommended:—

Elixir of Black Currant (Elixir Ribis Nigri).

I.

Black currant	4 pounds.
Alcohol, 95 per cent	4 pints.
Sugar	4 pounds.
Water, sufficient. for	16 pints.

Crush the currants with a wooden pestle, introduce them into a wide-mouthed bottle, add about 2½ pints of alcohol, and set the whole aside for a week, with an occasional agitation. Then press out the liquid, reserve the first maceration, and add to the dregs the remainder of the alcohol. After another week's maceration, express the liquor with strong pressure, mix the two macerates together, add the sugar, complete the measure with water, and after forty-eight hours contact, filter the finished elixir.

II.

Black currant	3½ pounds.
Raspberries	½ pound.
Alcohol	4 pints.
Sugar	5 pounds.
Water, sufficient, for	16 pints.

Operate as above.

III.

Black currants	3½ pounds.
Raspberries	½ pound.
French brandy	8 pints.
Sugar	5 pounds.
Water, sufficient for	16 pints.

Make two successive macerations of the fruits, previously crushed, in different portions of the brandy, and complete as above.

The first formula affords a good preparation, full-flavoured, and very pleasant to the taste. Besides its deep red colour is attractive to the eye, because it is exempt from the artificial appearance of the more gaudy anilin colourings. The same remark applies to

* From the *Druggists' Circular*.

the other formulas; only the second is of rather finer flavour, an improvement easily obtainable, as raspberries come in season at nearly the same time as currants. As to the third it will of course produce a rather expensive preparation, comparatively, but very fine—too fine perhaps, as some might be inclined to take it pure.

The following modifications of some French formulas may be acceptable:—

Hydrochloric Acid Elixir.

Elixir of black currant	14 fl. ozs.
Simple syrup	2 fl. ozs.
Hydrochloric acid, pure	160 drops.

Dose, half an ounce, taken in water.

Pepsin and Acid Elixir.

Elixir of black currant	14 fl. ozs.
Simple syrup	2 fl. ozs.
Pepsin	102 grs.
Hydrochloric acid, pure	100 drops.

Dose, half an ounce in water.

Many other like formulas might be given, but they will suggest themselves to the practical pharmacist. One word of caution, however, may not be amiss. Black currant elixir is not a neutral solvent like most simple elixirs so often employed. It contains a certain quantity of free citric acid that must be taken into account in making the preparations. Thus its natural acidulous taste renders it a very acceptable vehicle for acid phosphates, pepsin, quinine, and alkaloids generally; also for most iron preparations. But the same acid reaction precludes its being combined with solutions of valerianates, iodides, etc., citrate of bismuth, and under certain circumstances pyrophosphate of iron. Like most things well adapted to a certain use, black currant elixir will not answer all purposes indifferently.

FRAGRANT AND ANTISEPTIC MOUTH-WASH.*

The following formula has been practically tested. The essential oils used in its preparation should be of the very best and freshest quality:—

Safrol	360 min.
Oil of Pinus pumilio	120 „
„ Curaçoa	120 „
„ Vetivert	6 drops.
„ Wintergreen	24 „
„ Anise, Saxony	6 „
„ Rose Geranium, Afr. . . .	6 „
Naphthol	60 grains.
Deodorized alcohol	24 fl. oz.
Solution of saccharin	½ „
Glycerin	8 „
Purified talcum	2 tr.
Water enough to make	6 pints.

Dissolve the essential oils and the naphthol in the absolute alcohol, add the glycerin, the purified talcum, and afterwards 3½ pints of water, previously heated to a temperature of 122° F. Stopper the vessel securely, and shake the contents frequently until they are quite cold. Then filter through a netted filter, returning the first portions of the filtrate until it runs through clear, and pass enough water through the filter to make the product measure 16 fluid ounces.

The "solution of saccharin" directed in the above formula is one containing 4 grams of saccharin in the fluid drachm, which is the strength recommended by the National Formulary Committee. It is prepared as follows:—

Dissolve 512 grains of saccharin and 240 grains of bicarbonate of sodium in 10 fluid ounces of water (taking care that the reaction is made to take place in a sufficiently large vessel to prevent loss from the resulting effervescence), then filter the solution, add to it 4 fluid ounces of alcohol, and pass enough water through the filter to make 16 fluid ounces.

* From the *American Druggist*, May.

NEW FORMULÆ FROM THE UNOFFICIAL FORMULARY, B.P.C., 1888.

In the last number of the Journal, on p. 182, the formula for Syrupus Pruni Virginianæ, B.P.C., through an accident, appears in an imperfect form. It should have been given as printed below. The opportunity has also been taken to quote the formula for Liquor Picis Carbonis, B.P.C., in full.

Liquor Picis Carbonis.
Solution of Coal Tar.

Take of—

Quillaia bark,* in No. 20 powder. . . 2 oz.
Rectified spirit, a sufficient quantity.

Moisten the powder with a suitable quantity of the menstruum and macerate for twenty-four hours in a closed vessel. Then pack in a percolator, and gradually pour rectified spirit upon it until 1 pint of percolate is obtained. To this add—

Prepared coal tar . . . . . 4 oz.

Digest at a temperature of 120° F. for two days, allow to become cold, and decant or filter.

Syrupus Pruni Virginianæ.
Syrup of Wild Cherry.

Take of—

Wild cherry bark,† in No. 20 powder . 3 oz.
Refined sugar, in coarse powder. . . 15 „
Glycerine . . . . . 1¼ fl. oz.
Distilled water, a sufficient quantity.

Moisten the powder with distilled water, and macerate for twenty-four hours in a closed vessel, then pack it in a percolator, and gradually pour distilled water upon it until 9 fluid ounces of percolate are obtained. Dissolve the sugar in the liquid, by agitation, without heat, add the glycerine, strain, and, if necessary, pour sufficient distilled water over the strainer to produce 1 pint of syrup.

Dose.—½ to 2 fluid drachms.

FLORAL FETE AT BATH.

After the close of the Conference business at Bath on Wednesday, the 5th inst., as mentioned last week, many of the members paid a visit to a floral show held in the Sydney Gardens, a beautifully wooded space on the east side of Bath, well adapted for the purpose. The humidity of the atmosphere somewhat marred the effect of the fine display of flowers and plants, which included exhibits from many of the leading florists and seedsmen, as well as from many noblemen and gentlemen, whose gardeners entered into the competition with great zest. Among the flowers and fruits shown may be mentioned particularly the exhibits of begonias, gloxinias, asters, phloxes, heaths, double, single, and variegated dahlias, gladioluses, curious orchids and pitcher plants, and lilium auratums, the large showy flowers of which had been brought to great perfection. A fine Alocasia Van Houtii was exhibited by Mr. Booth, as well as a curiously variegated *Ficus elastica*. The collection of fruits was a most tempting display, more especially the grapes, peaches, nectarines, and tomatoes. Many of the latter were very large and even in outline, showing the perfection to which the growth of the fruit in this country has been brought during the last few years; some of a lemon colour were very beautiful in appearance. The tendency to aqueous suffusion of the mouth produced by the foregoing was corrected by esculents more useful to the housewife, such as fine celery, carrots, and almost eyeless potatoes, of which there were good displays.

* *Quillaia Saponaria*, Molina.
† *Prunus serotina*, Ehr. The bark collected in Autumn.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 15, 1888.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE MEETING OF THE BRITISH ASSOCIATION.

LAST week we were only able to refer briefly to the meeting of the British Association in Bath which has just terminated. As might be expected the attendance—as shown by the number of subscriptions paid—was not so large as it has been when the Association has met in some of the more populous towns or cities, but the meeting was not without its features of success; the presidential addresses were well up to the average, and among the numerous papers read were several of considerable interest. It is impossible at present, in the space at our disposal, to do more than indicate in the briefest manner how some of these papers touched upon the sciences that may be supposed to be most familiar to our readers. But we purpose taking the first opportunity to reprint the more salient portients of some of them.

The address delivered by Sir FREDERICK J. BRAMWELL as President of the Association is now before our readers in a complete form. Although avowedly mainly a laudation of the civil engineer, its defence of the position of applied science is not without interest to the followers of an art so dependent upon scientific principles as pharmacy; they can also sympathize with the speaker in his views as to the importance of "next-to-nothings." In the Mathematical and Physical Section, Professor FITZGERALD chose as the principal topic of his address an exposition of the experiments of Dr. HERTZ, which have practically demonstrated the truth of the theory that electro-magnetic actions take place by means of an intervening medium. In the Chemical Section the address delivered by Professor TILDEN, which will be found in another part of this Journal, dealt with past and present provision for the teaching of chemistry in this country. An important report was also read by Professor DUNSTAN in this section from a committee appointed for the purpose of inquiring into and reporting on the methods of teaching chemistry. One of the section's most interesting meetings was also attended by the biologists, when Professor MICHAEL FOSTER and Mr. W. T. THISELTON DYER formulated some of the desiderata of physiologists from chemists, and were replied to by Sir HENRY ROSCOE and Professor ARMSTRONG. The President of the Biological Section, Mr. W. T. THISELTON DYER, as was natural in the head of the most important botanical institution in the country, delivered an address which was mainly an argument as to the importance of botanical study in solving any biological problem. It contained a plea for greater attention to systematic botany, after which the "new Lamarckian" theory was discussed, and it concluded with some very interesting remarks upon ferments and fermentation. One other section must be noticed, that of Mechanical Science, where the President, Mr. W. H. PREECE, delivered a most interesting address on the practical applications of electricity. It is worthy of note, as indicating how far in the case of electricity practical application has outstripped scientific knowledge, that the speaker represents the physicist as dogmatically asserting that electricity may possibly be a form of matter, but that it is not a form of energy, and the engineer as asserting with equal positiveness that it is a form of energy and not a form of matter. Important papers on the application of electricity as a motive power and in smelting operations were read by Mr. ANDERSON and Mr. R. E. CROMPTON, whilst Professor GEORGE FORBES gave an account of electric lighting in the United States. The electric transmission of power was also the subject of an evening's discourse by Professor AYRTON. But probably the most attractive feature of the whole meeting was found in the descriptive communications upon the phonograph and the graphophone illustrated by practical demonstrations of the capabilities of the two instruments. There was also a joint meeting of the Mathematical and Physical and the Mechanical Science Sections, at which the rival views of Mr. PREECE and Professor LODGE in respect to lightning conductors—copper *v.* iron—were discussed. Indeed the meeting appears to have been particularly rich in communications upon electrical science, so that Sir WILLIAM THOMSON expressed an opinion that it would prove epoch-making in the history of electrical discovery.

At the meeting of the General Committee on Monday it was decided that Professor FLOWER, of the Natural History Department of the British Museum, should be asked to preside over the Association at Newcastle-on-Tyne next year, and that the meeting should commence on the 11th of September. It was also resolved to accept the invitation for the Association to visit Leeds in 1890.

REPORT OF THE COMMISSIONERS OF INLAND REVENUE.

THE thirty-first annual report of the Commissioners of Inland Revenue just issued contains, as has usually been the case with its predecessors, several items of information upon subjects in which chemists and druggists are more or less interested beyond the

general public. Dealing first with the "excise" receipts, which constitute more than one-half of what is known as the "inland revenue," these in the year ending the 31st of March last amounted to £25,625,520, being an excess over the income from the same source in the previous twelve months of £412,637, which is mainly attributed to the increased yield of the beer and spirit duties. Last year duty amounting to £13,028,204 was paid on 27,371,987 gallons of spirit, against £12,852,767 on 26,935,873 gallons, or an increase of £175,437 and 436,114 gallons on the figures of the previous one. Nearly three-fifths of this increase, which is the first on account of spirit since 1883-84, is attributable to Scotland and the other two-fifths nearly equally to England and Ireland. Although the total quantity of spirit used for beverage showed an increase, the individual consumption remained practically stationary at 0·704 gallon per head. The export of British spirit was considerably augmented, as was also the quantity methylated, which amounted to 2,767,492 gallons, or 94,117 gallons more than in the preceding year. Indeed it is estimated from the quantity of naphtha "approved" by the laboratory officials as fit for this purpose that the industrial consumption of methylated spirit has about doubled during the last ten years. Illicit distillation, judging by the number of detections, appears to have been greater by 50 per cent. as compared with the previous year. Most of these detections—1808 out of 1851 in the United Kingdom—occurred in Ireland, and the increase is supposed to have been due to the difficulty experienced by the people in obtaining a market for oats and barley. The quantity of beer consumed amounted on the average to 0·747 barrel per head of the population, and the net receipts on account of the beer duty amounted to £8,711,533, being the highest point this duty has ever reached, a "breaking of the record" that is officially attributed partly to the jubilee rejoicings that took place in June and July last. But nevertheless beer is not the only beverage of which there was a larger individual consumption. The quantity of foreign wine consumed in 1887 rose from 0·359 gallon per head of the population to 0·366 gallon; tea from 4·877 lbs. per head to 4·948 lbs., and cocoa from 0·413 lb. per head to 0·434 lb.; on the other hand the consumption of coffee declined from 0·861 lb. per head to 0·790 lb.

Whilst referring to the subject of beverages mention may be made of the growing difficulty experienced in keeping the sale of liquids containing alcohol in legitimate channels. Many "temperance" beverages, when examined in the laboratory at Somerset House, have been found "anything but free from alcohol." Among these have been "elderberry syrup," containing 8·7 per cent. of proof spirit; "non-alcoholic ginger cordial," containing 10·8 per cent.; "unfermented sherry," containing 17 per cent; and "cowslip wine," containing 28·9 per cent. Out of 324 samples of "herb," "ginger" and "botanic" beer examined to ascertain whether they contained more than the 2 per cent. of proof spirit allowed by law in beverages sold free from excise restrictions, there were 101 in which an excess was present, the quantity ranging from 3 to 10 per cent. "Medicated wines" furnish another instance, and the opinion is expressed that in many instances "coca" and other wines put before the public with representations that they possess medicinal virtues are so prepared that both as regards flavour, and the size and frequency of the dose recommended, they are evidently intended for use as beverages. Hence probably the difficulty experienced by the Unofficial Formulary Committee in constructing a formula for coca wine that was acceptable to the excise authorities. "Pepsi-champagne" and "coca-champagne" examined are said to have "only possessed their prefixes to distinguish them from champagnes of ordinary quality;" "Riga balsam" proved to be a liqueur having a very pleasant flavour; while "British port" and "British sherry" sold in the North under a sweets license contained so much foreign wine as to render the sellers liable to a penalty.

"Patent medicines" still appear to be a growing source of revenue to the state, the receipts on account of stamps having again risen, from £179,508 to £191,475, being an increase of £11,967 upon the receipts of the previous year. The revenue on account of licences to sell patent medicines amounted to £5400, representing 21,600 licences, 20,072 of which were issued in England and Wales and 1528 in Scotland, Ireland being free from the impost. There were also 7806 licences for retailing methylated spirit issued in England, 827 in Scotland and 260 in Ireland, the receipts on this account amounting to £4551. Another item not without interest to chemists and druggists just now is an increase of 250 in the number of joint-stock companies registered, which last year reached 2177, paying fees amounting to £43,215.

Reference has already been made incidentally to some of the work done in the laboratory at Somerset House. In his report the Principal states that the number of analyses made during the year was no less than 39,224, being 11,580 more than in the preceding twelve months. A large number of these were incidental to the collection of excise duties, and the increase was mainly due to the limit (35 per cent.) placed by recent legislation on the quantity of water that may be present in manufactured tobacco. Fifty samples that were the subject of disputed analyses were referred to the department by magistrates under the provisions of the Sale of Food and Drugs Act, thirty-three of which were milk, and the others cream, butter, whisky, gin, beer, coffee, pepper, mustard and water. In thirty-eight cases the

Principal confirmed the conclusions of the public analyst, but in the other twelve the results obtained were considered to be insufficient to sustain the charges alleged. A large number of other analyses were made for the various public departments, among which, one made for the Board of Trade, was that of a saline mixture alleged to possess the property of rendering sea-water potable in cases of emergency, but the report does not seem to have been favourable to its adoption. Another interesting investigation was made on behalf of the India Office in reference to the cause of damage which occurred to a consignment of hides that had been sent to India in zinc-lined cases. On analysis it was found that "the salts "used in curing the hides had combined with the "zinc lining of the case to form compounds which "had subsequently attacked the leather and ren- "dered it perfectly useless."

As by the provisions of the Jury Act the lists of persons qualified and liable to serve on juries are affixed to the doors of all places of public worship on the first three Sundays in September, it may be useful to pharmacaceutical chemists who desire to maintain exemption from service to suggest that they should satisfy themselves by inspection that their names are omitted from the lists of their respective parishes. In the event of the name of a pharmaceutical chemist being improperly inserted in such a list he should apply on the day of appeal to have it expunged, because its retention on the list would involve him in liability to serve.

* * *

Still another addition must be made to the cases of poisoning by carbolic acid in Liverpool that have been recently reported in these columns, another woman having killed herself by drinking the acid from a bottle that she supposed to contain spirit. This is the seventh case of carbolic acid poisoning that has occurred in Liverpool during the past six or seven weeks. In a Belfast hospital also there has been a death consequent upon the improper administration of a medicine containing carbolic acid.

* * *

The Midland Counties Chemists' Association has issued an announcement that the classes for pharmaceutical students under its auspices will be resumed on Monday, October 1, at the Educational Chambers, 90, New Street, Birmingham. There will be a "Preliminary" class under the charge of Mr. Stokes Dewson, meeting on Monday and Wednesday evening, and "Minor" classes, meeting on Tuesday and Friday evenings, in which Chemistry and Chemical Physics will be taught by Mr. Stokes Dewson, Botany and Materia Medica by Mr. F. H. Alcock, and Pharmacy by Mr. G. E. Perry. If a sufficient number of students be forthcoming, a class for Practical Dispensing will also be formed, as well as a class for students desirous of qualifying for the "Major" examination.

British Pharmaceutical Conference.

MEETING OF THE EXECUTIVE COMMITTEE.

A meeting of the Executive Committee was held at the Grand Hotel, Bath, on Monday, September 3, at 10 p.m.

Present—Mr. F. B. Benger, President, in the chair, Messrs. Atkins, Conroy, Dott, Gerrard, Greenish, Groves, Martin, Martindale, Plowman, Ransom and Symes, Dr. Thresh and Mr. W. A. H. Naylor, Hon. Gen. Secs., and Mr. J. C. Nightingale, Asst. Sec.

The minutes of the previous meeting were read and confirmed.

Letters regretting inability to attend were read from Messrs. Davies, Maben, Reynolds, Umney and Williams.

A draft report for presentation at the annual meeting was submitted by the Hon. Gen. Secs., and agreed to.

The order in which papers should be read at the general meeting was discussed, and the programme arranged.

The Treasurer's financial statement for the year 1887-88 was read and approved.

A proposed list of officers for the ensuing year was discussed and adopted for recommendation to the general meeting for election.

Mr. Naylor then stated that the M.S. of the 'Year-Book' for 1888, so far as it could be completed, was in the hands of the printer.

The place of meeting for 1889 was considered. Mr. Martin, speaking as Chairman of a Committee of pharmacists which had been formed in Newcastle-on-Tyne, cordially renewed the invitation to the Conference to hold its next sessions in that city. The President moved that this invitation so kindly given be recommended to the General Meeting for acceptance. This was seconded by Mr. Martindale and carried.

A report of the Formulary Committee was presented through its chairman, and read by Mr. Naylor.

The report was accepted, and it was agreed to recommend to the General Meeting the re-appointment of the Committee.

Mr. Naylor then read a letter from Mr. Mason, who now resigns the office of Hon. Sec. for Canada. Proposed by Mr. Martin, seconded by Mr. Plowman, and carried, that a hearty vote of thanks be given to Mr. Mason for his services as Honorary Secretary for Canada.

It was announced that the following donations had been received, and the thanks of the Committee were accorded to the respective donors:—'Sixth Annual Report of the Illinois Board of Pharmacy' 1887, and 'Proceedings of the Tenth Annual Meeting of the New York State Pharmaceutical Association,' 1888.

Twenty gentlemen were duly nominated and elected to membership.

TWENTY-FIFTH ANNUAL MEETING.
FIRST DAY'S PROCEEDINGS.

Tuesday, September 4.

(*Continued from page* 200.)

Report of the Formulary Committee.

Mr. Martindale, as Chairman of the Unofficial Formulary Committee, read the following report:—

"In laying before you the Unofficial Formulary of 1888 the Committee think a few remarks explaining the alterations and additions made in the present issue are necessary. In the first instance, a formula is given for Acetum Ipecacuanhæ, for which there is a considerable demand in many districts; it is of the same strength as the official wine. From it is prepared Syrupus Ipecacuanhæ Aceticus—suitable for

children. It should be particularly noticed that it is an acid syrup, not compatible with carbonate of ammonium. The Committee have added two preparations of free phosphorus, a compound tincture and an elixir, both of which will be found active and stable. Formulæ for Elixir of Saccharin and Liquid Extract of Triticum Repens are included. The previous formula for Emulsion of Cod Liver Oil has been replaced by one in which yolk of egg is used to help the emulsification of the oil. This will be found a great improvement, as tragacanth alone is not a good emulsifier. The hypophosphite preparations are never very satisfactory ones to pharmacists. The Committee have endeavoured to simplify them by giving a process for making a Strong Solution of Hypophosphite of Iron from which the other liquors and syrups may be made readily. This solution of ferrous hypophosphite, containing 5 grams of the salt in the fluid drachm, is prepared by the double decomposition of solutions of ferrous sulphate and hypophosphite of barium, with the addition of a small quantity of sulphuric acid to throw out all traces of the barium salt. When syphoned off it should be kept in a dark place, in well stoppered bottles, quite full, preferably in small bottles, so that the whole of the contents of one can be used at one time in making the preparations into which it enters. These are the Compound Solution of Hypophosphites, formerly named Liquor Ferri Hypophosphitis Compositus, Syrup of Hypophosphite of Iron, and the Compound Syrup of Hypophosphites. The Committee have also simplified the formula for Liquor Picis Carbonis. The formula for Tincture of Quillaia has been deleted; it was never intended for internal administration, and it has therefore been incorporated in the process for making Liquor Picis Carbonis. Formulæ are given for Syrup of Codeine, Syrup of Wild Cherry, Syrup of Bromide of Iron, and for Syrups of combinations of this with quinine and strychnine. As external applications formulæ have been added for Tincture of Calendula Flowers, a Stronger Tincture of Capsicum and for an Ointment of the Oleo-resin of Capsicum. A note has been added that Decolorized Tincture of Iodine may be used as a stronger preparation if indicated or prescribed with the word "Fortior" appended to its name. A formula is added for Tincture of Euonymus, which meets with favour from many physicians. The Committee regret they have been unable to give a formula for coca or cocaine wine, as they were unable to devise one that would meet the requirements of pharmacists without necessitating their being compelled to take out a wine license.

"WILLIAM MARTINDALE, *Chairman.*
"*Bath, September* 4, 1888."

The PRESIDENT moved that the report be received, adopted and published. He remarked that the value of these reports was shown by the fact that last year 2250 copies of the Unofficial Formulary were sold.

Mr. ROBINSON seconded the motion. A year or two ago he had some doubts as to the best plan of presenting the report of this Committee to the Conference, but he must confess that he could not suggest any better method than the one which had been adopted. It would be obviously impracticable to have each formula submitted and discussed separately, and there were several guarantees that they were doing right. First, the guarantee of the able and self-sacrificing gentlemen who formed the Committee. Next there was the fact of the new and improved formulæ presented last year having been so well received, and he could not but express the hope that when next the Medical Council required to issue a new edition of the British Pharmacopœia it would look to the Formulary Committee of the Conference for assistance. In addition to this there was the fact of the publication of last year's report having yielded a profit of £22, and bearing that in mind he thought the Conference would be ready to adopt such a motion as the present, and next year he hoped the profit would be twice as much.

The motion was carried unanimously.

THANKS TO THE UNOFFICIAL FORMULARY COMMITTEE.

Mr. SIDNEY PLOWMAN proposed a vote of thanks to the Formulary Committee for the report as presented by the Chairman, as well as for the additions the Committee had made to the Unofficial Formulary published last year. Everyone must have been struck with the admirable character of the work embodied in that publication. As a member of the Executive Committee he had had an opportunity of glancing through the additions made during the past year, which appeared to fully maintain the very high standard then set. The fact that 2250 copies of the first edition of the Formulary had been sold, and the almost entire absence of adverse criticism, showed the splendid character of the work. He was told on all sides that the demand was increasing for preparations made according to the British Pharmaceutical Conference formulæ, and he was convinced that medical men would more and more gladly avail themselves of the opportunity of prescribing preparations not official in the national Pharmacopœia, but which were recommended by such a number of distinguished men as were on that Committee. Custom was very powerful, and in process of time he had no doubt it would make this Formulary practically binding on pharmacists, until a large number of the formulæ took their place in the British Pharmacopœia. Every member of the Committee deserved the highest praise, for they had worked at their own expense even for material, and in other ways, which it was not necessary to particularize, it was obvious to every pharmacist that their labours had been of a self-denying character. But special thanks were due to the Chairman, Mr. Martindale, and the Secretary, Mr. Naylor. The latter was London Honorary Secretary of the Conference, and as he himself for five years had had the honour of filling that position he knew what an amount of labour it entailed. But in addition to that, Mr. Naylor had to carry on all the correspondence, which must be very great when the members of the Committee, as in this case, resided in different parts of the country, in order to obtain that agreement which was necessary before publishing such an important work.

Mr. MASON seconded the motion. He had had the opportunity of viewing the work of this Committee from the other side of the water, where, if the conditions of early pharmacy were not very satisfactory, they had at any rate been the first to move in this matter, a Committtee of the American Pharmaceutical Association having been appointed for the purpose, some years ago, and it was with great pleasure that he had seen the Conference undertake the same work. The members of the Committee were giants in pharmacy, and other pharmacists were all much indebted to them for their labours. They had many difficulties to contend with, and as Mr. Plowman had said, the remarkably small amount of criticism which their work had evoked was the best proof of its value.

The motion having been carried unanimously,

Mr. MARTINDALE, in reply, said no doubt a considerable amount of labour was involved in this work, the principal difficulty being that the members of the Committee lived so far apart. The work done by the Committee was, perhaps, not so extensive as that of the American Formulary Committee, who had produced a roll of some 400 formulæ. The British Committee was not so ambitious as that, but it might, if re-appointed, produce, gradually, a few more formulæ. He was much

gratified to find that the work done was so much appreciated.

Mr. NAYLOR said he was sure all the members of the Committee would highly appreciate this vote of thanks. It would be mere affectation on his part to attempt to assume that the secretarial duties were very light, for they had involved a considerable amount of labour, but he could say honestly that it had been a labour of love.

The PRESIDENT then called for a—

REPORT ON THE CULTIVATION OF ACONITUM NAPELLUS.

BY E. M. HOLMES, F.L.S.

A suggestion was made at a former meeting of the British Pharmaceutical Conference that the cultivation of a definite form of *Aconitum Napellus* should be attempted, with the view of obtaining a quantity of the root of uniform character, to serve as a basis for a careful chemical investigation of the alkaloids contained in it.

This experiment I promised to endeavour to carry out, and two years since I commenced some preliminary operations. My first aim was to obtain a well-marked and easily recognizable form of *A. Napellus* and to observe the plant under cultivation, so as to find out the best means of easily distinguishing it from hybrids or from other species. Previous experience (as recorded in the 'Year-Book of Pharmacy,' 1882, p. 457) had shown me that a considerable number of forms of *A. Napellus* are in cultivation, some of which are doubtless hybridized to a certain extent with other species, such as *A. variegatum*, *A. paniculatum*, etc., and that owing to this cause it would not be possible to obtain from florists or from botanical gardens a sufficient quantity of the root for purposes of cultivation.

The only course open to me, therefore, was to obtain as best I could a few typical plants and to propagate them myself. In my search after such specimens I was assisted by Mr. J. C. Shenstone, of Colchester, who found in that neighbourhood a small collection of fairly typical plants of *A. Napellus*, which were secured at the cost of 10*s.*, and some of which were placed in my garden. Later on, Mr. P. W. Squire kindly promised me that he would place at the disposal of the Conference about ½ cwt. of the roots of a form of *A. Napellus* which he cultivates at St. Neots on an extensive scale, and of this form he kindly supplied me with several plants for observation.

A third form, which I have noticed for two years growing in a garden at Riverhead, near Sevenoaks, has been secured by me only this month.

These three forms, which will be mentioned hereafter as the Colchester, St. Neots and Riverhead plants, form the subjects of the present communication.

These plants being the nearest that I could obtain to the type of the species as described by De Candolle in the 'Prodromus,'* it still remained to see whether the plants of each set agreed among themselves or presented any marked differences in mode of growth or botanical character.

Having had the opportunity about six years ago of cultivating twenty species of this genus, I then noticed that *A. Napellus* presents when young a peculiar habit by which it is easily distinguishable from the allied species. When older, however, this habit disappears and the leaves of the plant cannot then be distinguished from those of other nearly related species.

* *A. Napellus* (Lin. spec. 751) floribus densò spicatis vel laxe paniculatis galea semicirculari rarò naviculari sacco cucullorum subconico, calcare brevi crasso inclinato alis staminum cuspidatis vel evanescentibus foliorum lobis cuneatis pinnatisectis, ovariis 3 vel rarò 5 glabris vel pilosis (Ser. Mus. Helv. I., p. 162, t. 15, f. 41, 42, 50).

The habit alluded to consists in the fact that the leaves, which in *A. Napellus* appear very early, form, when the stem is about 6 or 8 inches high, a dense tuft, the segments of the leaves being spreading and drooping at the ends. In *A. variegatum* and *A. paniculatum*, etc., the leaves when young are rigid, and the segments are close together and in one plane, and do not form a tuft. In addition, therefore, to the characters given by De Candolle, I deemed it necessary to ascertain whether the plants received from Colchester, St. Neots and Riverhead also possessed the habit of growth I had noticed in true *A. Napellus*.

The plants were placed in the only garden at my disposal, the soil of which is a ferruginous sand, to which I have added some chalk. As it is situated on the side of a hill, the Colchester and St. Neots aconites were planted at the lowest part, so as to receive as much moisture as possible. This was done because, so far as I could learn from persons who have seen the plant growing on the Alps, aconite prefers the sides of streams, and probably, therefore, a moist, well drained soil.

The results obtained were as follows:—In 1887 the summer was a remarkably dry one and the plants made but little progress, only a few of them flowering and none of them ripening fruit. This summer the weather has been more favourable to their growth, and the plants have flowered and fruited freely. Early in May the young leaves of the Colchester plant presented a pale-green tint, and the segments were remarkable for their linear outline. Those of the St. Neots plant were of a darker green tint, and had a purplish tinge on the petioles.

Some specimens of *A. paniculatum*, given me by Mr. P. W. Squire at the same date, had only just appeared above the ground, and presented a remarkably rigid appearance, due to the segments being close together and to the others in the same plane. Their colour was entirely different, being of decided purplish-brown tint. At this stage of their growth the three plants could not possibly have been mistaken for each other. Amongst the Colchester plants I observed one that had evidently been hybridized, as it presented an approach to the rigid leaves and trapezoidal segments of *A. varicgatum*. On calling Mr. Shenstone's attention to this, he kindly looked over the plants in cultivation at Colchester and eliminated all suspicious individuals. As my plants approached the flowering stage, both the Colchester and St. Neots varieties showed the drooping lobes and spreading segments and recurved margins of the leaves characteristic of the *A. Napellus* previously noticed, and when the flowers unfolded both evidently possessed the semi-circular hood of this species, the only difference being that in the St. Neots plant it showed a slightly prominent beak approaching that of *A. rostratum*, and that the leaves were less widely spreading. The flowers began to open about the middle of June, the season being very backward, and continued in blossom for nearly three weeks. *A. paniculatum* did not begin to flower until the first week in August and is still in bloom. The narrower, deeper, and less semi-circular hood, and strongly panicled inflorescence render it fairly distinct, at least to a botanical eye, although the leaves at this stage of growth are almost indistinguishable from those of *A. Napellus*. In *A. paniculatum*, however, the two outer segments of the leaves are shorter and all are less tapering than in *A. Napellus*. The St. Neots plants showed a greater tendency toward a panicled inflorescence, and the flowers had rather shorter pedicels than in the Colchester plant. This may have been due to the more robust nature of the plants, the soil at St. Neots being, apparently, stiffer and damper than at Colchester, and the plants originally more vigorous in growth. But the differences alluded to are by no means sufficient to

indicate that the plants are more than mere cultural forms of *A. Napellus*. The Riverhead plants I have carefully watched since the spring. They correspond exactly with the others in possessing the habit of growth and the semi-circular hood peculiar to *A. Napellus*, the leaves having the dark green tint of the St. Neots plant, but the inflorescence showed no tendency to become panicled. The lower ovaries had, however, frequently four carpels and more rarely five. The roots were large and well developed, the plants being grown in a rich mould containing some clay as well as sand. This peculiarity with regard to the number of carpels was noticeable also, but in a much less degree, in the Colchester and St. Neots plants.

The *A. paniculatum* grown in my garden differs when in flower from all the above mentioned in being a much taller plant, about 6 feet high instead of 3, in the well-marked panicled inflorescence, the narrower, not semi-circular hood, and in the carpels not exceeding three in number.

My next object was to ascertain whether any difference in strength existed between the three forms that I had obtained. The only experiment possible under the circumstances seemed to be that of taste. For that purpose I chose the seed as being tolerably equal in size in all, and presenting a state in which the strength was less likely to vary than in the leaves.

The Colchester seed caused tingling and numbness of the tongue in five minutes, and the sensation lasted an hour and ten minutes.

Seventeen hours after I tasted one of the St. Neots seeds. Tingling and numbness were produced in five minutes, and lasted an hour and three quarters, the numbing sensation being however less pronounced than with the Colchester seed.

The Riverhead seed I tasted two hours after the sensation of the St. Neots seed had disappeared. Tingling and numbness were produced in four minutes, and lasted for an hour and five minutes.

From this experiment I gather that there may exist slight differences in strength in plants grown in different soil, or slightly different in vigour of growth, and that it would be advisable for purposes of analysis to examine the roots and each form separately.

The next point that seemed worthy of investigation was the yield of root that might be expected each year. To ascertain this all the specimens in my garden were rooted up and examined a few days ago.

In the majority of cases the flowering plant had two lateral roots attached; in a few plants three or even more were present, but in these cases the extra roots were developed from axillary stem buds, and were not on the same level as the original root. The shape and size of the new roots varied considerably according to age. The young roots appear to first develop as lateral buds, which send downwards a single or rarely a forked root. Sometimes also one or more of the rootlets of the new growth developes in a conical form and so gives a forked or triple character to the root. In robust plants the new root is obovate in shape, sometimes at first tapering suddenly into a main rootlet. The lower part of the root, however, soon swells, so as to obliterate the contraction, and the root becomes long and tapering and fleshy throughout like a radish. The old root in August is usually much smaller than the new root, but not shrivelled when fresh.

Several of the larger roots were weighed, and the average weight with the rootlets was found to vary between $1\frac{1}{4}$ and $1\frac{3}{4}$ ounces, or without rootlets between $\frac{3}{4}$ and $1\frac{1}{4}$ ounces. Allowing for loss in drying this would give about $\frac{1}{4}$ to $\frac{1}{2}$ ounce as the weight of each root, and supposing that only sound, well formed roots were selected for medicinal purposes, it would take about 50 plants to yield one pound of dried root.

As each plant normally produces two new roots, the amount grown might be expected to be doubled each year, or reserving one of the larger new roots, the plants would give a uniform yield without lessening the amount under cultivation. This would, however, be actually increasing, since there are always a few smaller additional roots formed by some of the plants.

Having only a limited number of plants in my own garden (about twelve of each variety), I have not thought it desirable to attempt to determine the best time to collect the root, which could only be done by examining the progress of the roots every month. This point, however, has been kept in view for me by Mr. P. W. Squire, who at my request has kindly had a plant pulled up from his large stock every month since last October, and has noted the time of appearance of the new roots, and their gradual development, and has promised to publish in November next the results of his observations. So far as I am able to state from my own examination of the plants in August, the majority of the new roots appear to be fully formed at that date, and the seeds being ripe and the leaves turned yellow, the activity of the plant is more likely to be found in the root. A month later the roots might however be still more developed, and in all probability the autumn before the frosts commence would be the best time to collect the root of the cultivated plant.

I may here mention that the rootlets, of which a considerable quantity is sometimes present, are by no means devoid of activity, judging from the tingling and numbness produced on chewing a small piece. The soil in which the plants appear to succeed best, is a rich mould capable of retaining moisture, but not too clayey, and containing a little lime. An analysis of the mineral matter contained in the roots would however throw a more accurate light on the mineral requirements of the plant.

With respect to the propagation of the plant I think the best method will probably be division of the roots as soon as the fruit has ripened, for I have observed that if the roots are not divided, in two years they become small, crowded, and badly developed. In nature separation and distribution is probably provided for by natural causes, such as mountain torrents. As there would be no object in retaining the flowers and seeds where once the typical character of the plant is ascertained, it would probably add to the vigour of the roots if the flowering axis were not allowed to develope for I have observed that the plants from which I removed the flowers for herbarium specimens developed larger and stronger new roots than those which I allowed to ripen seed. Propagation by the root is also more satisfactory in such a variable plant as *A. Napellus*, as thereby hybridization is avoided and greater uniformity of character could be obtained in the root. My experience in cultivating the plant from seed has not been favourable. Only a few plants germinated from a parcel of seed sown last spring, and these were eaten off by insects or slugs before three leaves had developed. Seedlings are also very rare in gardens where plenty of seed is produced. In some years but few seeds ripen and the carpels are destroyed by earwigs. The fruit should be collected as soon as the carpels lose their green colour, otherwise they dehisce and the seed is lost.

I have, however, collected seed of all the three forms herein mentioned, and intend to experiment further with them this year.

I need only add that the roots which have been retained under Mr. Shenstone's supervision at Colchester and those promised from St. Neots by Mr. P. W. Squire are at the disposal of the Conference when required. I venture to suggest, however, that they should remain intact until the end of October.

The PRESIDENT, in moving a vote of thanks to Mr. Holmes, reminded the members that this was a first report in response to the call made upon Mr. Holmes

last year, when a grant was made for the purchase and cultivation of authentic specimens of *A. Napellus*, with a view to the subsequent extraction and chemical examination of the alkaloidal constituents. The members present were also indebted to Mr. Holmes for exhibiting the remarkably fine specimens he had brought with him.

Professor HILLHOUSE said this subject was one in which he, as a botanist, naturally took some interest, and as a physiologist he was also interested in the method of the experiment adopted, though the conclusion to which the report would ultimately lead was one perhaps rather foreign to his own wishes. In the first place, he must express his satisfaction that something had been done with this most troublesome plant. He had *Aconitum Napellus* growing under his own care in three different places, and was quite sure that he had at least three different forms, and had been much puzzled to decide which was the true one. He had referred to all sorts of books, and found they did not by any means agree, and if anything satisfactory on this point could be determined, it would remove one source of tribulation which had affected him considerably during the last few years. With regard to the experiments detailed, he was hardly disposed to think that the initial method of testing the action of the seed on the tongue was likely to be a very satisfactory one. As far as his experience went, seeds were not so invariably constituted as Mr. Holmes appeared inclined to think. Assuming even that they were all ripe at the same time, and that they were taken from the same plant, he would probably find considerable differences between them by this method of experiment. He believed the vast majority of the seeds were not fertilized at all, and if he happened to get hold of one which was fertilized, the chances were that its active principles would be much more developed than those in one unfertilized, so that seeds even from the same capsule might differ very materially. He was not quite sure whether Mr. Holmes stated that he found a progressive rapidity in the commencement of the signs of tingling, and also a progressive prolongation of the period during which it lasted, in the three specimens examined.

Mr. HOLMES said that was not quite so.

Professor HILLHOUSE said that apart from what these particular results would have been, that was the kind of result he should expect on physiological grounds from experiments repeated at short intervals, even if the seeds were really no more active. He would, therefore, suggest that in future experiments a number of tests should be made on different subjects. He did not know that the results would be very conclusive, but it was a point worthy of being borne in mind. With regard to the utilisation of the rootlets, he would mention that the soil at St. Neots was a somewhat strong alluvium; in the valley of the Ouse close by there was a considerable amount of boulder clay, so that he thought Mr. Holmes's diagnosis of the soil was pretty accurate; but the difference between that soil and the soil in which Mr. Holmes had grown his plants would account for a considerable difference in the roots, apart altogether from the season. In a sandy soil a plant would tend to make rootlets much more than in a heavier one, and probably, therefore, the plants which Mr. Squire grew were not so much influenced to produce rootlets as they would be if grown in a sandier soil. So that commercially the rootlets would not be so important if the plants were grown in a clay or loam. He would emphasize most strongly the hint thrown out as to the wisdom of removing the flowers. If it were desired to concentrate energy in a root, the flower should be stopped at the earliest possible moment, directly the flower buds appeared. In that way the strength of any product yielded by the root would be much intensified. This should be done systematically, however, or else samples of very different strengths would be sent into the market. He should be very glad when Mr. Holmes had obtained a true typical specimen of the *A. Napellus*.

Mr. MARTINDALE said he should have liked to hear that Mr. Holmes made some experiments on the root of the wild *Aconitum Napellus*. Nearly the whole of the roots coming into the market were obtained from wild plants collected in Germany or Switzerland, and it was these which, if possible, they wanted to be able to obtain uniform, and to authenticate a specimen of the wild *Aconitum Napellus*. The virtues of all wild plants were generally affected when they were cultivated. In the Alpine districts aconite plants were frequently seen growing wild, but hardly in the way Mr. Holmes had described; he could not say whether they were all *A. Napellus* or not, but he had seen the plant growing isolated, generally on sunny banks, not from clustered roots. This seemed to be the form of root which came principally into English commerce, whether derived from seed or not he could not say, but it seemed not to be propagated from roots branched in the form in which tubers were obtained when cultivated in English gardens.

Mr. RANSOM said he was in Switzerland a short time ago, and noticed a considerable number of aconite plants growing in the positions described by Mr. Holmes, in a valley by a stream. In one or two cases he tested them as far as he was able at the time, and they speedily produced a tingling sensation which appeared more prolonged than with the cultivated plant. He had been trying to cultivate plants from seed, but had failed hitherto.

Mr. GROVES said he could not follow the botanical part of the paper, his attention to aconite having been confined to the chemical side, and he had found the results obtained from various specimens had been very diverse. He did not think he had been able to obtain the same results from any two specimens, and therefore it occurred to him that different varieties of the plant must have been employed. On this account the investigation was entrusted to Mr. Holmes, to whom the thanks of the Conference were due for having gone so fully and systematically into the matter in this first report, which he hoped would be followed by others. When Mr. Holmes had discovered the true type of *A. Napellus*, it would be for chemists to take up the problem, and ascertain what it contained and in what proportions. One great difficulty was that occasionally roots yielded simply a bitter alkaloid, which resembled somewhat the active variety in form and chemical characters, but was inert. Some years ago Mr. Cleaver said that the inactive variety was obtained from *A. paniculatum*, and he was glad to find that Mr. Holmes was cultivating this species amongst others, and when a sufficient quantity of the root had been obtained, he should be very pleased to examine it. Some few months ago he saw that a German investigator had found out a means of converting the active alkaloid into the inert, he believed simply by the action of heat and water, a sort of hydrolysis, or something of the kind. The great difficulty at present was to ensure a crystalline alkaloid of definite character and strength.

Mr. PLOWMAN, in view of the statement just quoted from Mr. Cleaver, desired to ask Mr. Holmes whether he had tasted the specimens of *A. paniculatum* he had cultivated, and, if so, whether the results bore out that statement. He agreed with Professor Hillhouse as to the illusory nature of any test for the comparative value in aconitine by merely exciting the nerves of the tongue by these various plants. Of course it would be a valuable test in this sense if the *A. paniculatum* contained no numbing or tingling aconitine, as Mr. Cleaver stated. The Conference might be congratulated on having so good a return for its outlay since last year. This was a first-rate report,

and it was exactly the kind of work which the Conference might properly take up. The central point of all investigation was to be quite certain about the material one is working with, but throughout the aconitine researches, which formed quite a library in themselves, it was evident that the investigators had not always been certain what they were dealing with. He hailed with great satisfaction the experiments in cultivation which Mr. Holmes was making, and thought there was at length a probability of arriving at something definite concerning the various aconite plants.

Mr. GREENISH said the aconite imported into this country, usually called German aconite, was obtained from the range of mountains running from Bohemia right across to Salzburg, named the Giant Mountains, and the method of collection was somewhat loose. A man went out and dug up roots of different kinds, which were all thrown into one sack and brought home, and he then depended simply on the appearance to determine what they were, whether gentian or aconite, and naturally mistakes sometimes occurred. One part of this report was very suggestive of the effect of cultivation on such plants as aconite and belladonna. He thought it had been proved that aconites collected in mountainous districts were stronger—yielded more active principle—than those which had been, more or less, cultivated in this country; and he hoped that at no very distant period the Research Laboratory would determine this and some other points, such as whether the active principle of belladonna resided mainly in the leaves or in the root.

Mr. HOLMES, in reply, said it was quite certain, as Professor Hillhouse had mentioned, that the seeds were often unfertilized. With regard to his choice of seed for experiment, he first of all emptied the whole of the follicles of seed into packets, and then chose out of each packet one apparently full-grown, and as nearly as possible of the same size from each variety, which he tested. The plants themselves varied so much in size and robustness, that if he had chosen a leaf, a root, or a stem, he could not have made so good a comparison. He would also remind them that he tested the roots as well. With regard to the removal of the flowers, he might mention that at Banbury, where rhubarb was cultivated to a large extent, it was the habit to remove the flowers to strengthen the roots, and, as a result, the plants ceased to flower, and it was now very rare to see a rhubarb in flower at Banbury. No doubt the same thing would happen with aconite if the flowers were removed year after year. With regard to variations in the strength of individual plants he feared nothing could be done to alter that; but with a soil and climate as nearly as possible like the natural one he saw no reason why the cultivated plants should not be nearly as strong as the wild ones. This was illustrated by the fact that in his attempt to cultivate belladonna he could only obtain plants of a very small size, not exceeding 2 feet in height, whereas on the chalk hills a few miles off they grew to 8 or 10 feet. It was obvious that the conditions in his ground were not suitable. If the right conditions could be obtained for each plant it was desired to cultivate, it might be possible to get a good product. The difficulty in the case of aconite was that dependance could not be placed on the wild roots which were sent over; but if, on the other hand, there was a fairly recognizable form of *A. Napellus*, showing certain characteristics of leaf and flower, there would be the means of cultivating a form which would be as uniform as it was reasonable to expect. He would remind Mr. Martindale, who said it would be well if a comparison were made between the wild and cultivated plants, that an investigation of wild aconite gathered in the Pyrenees, a very definite plant, was made by a French chemist, M. Duquesnel, and the results were to be found in the Library of the Pharmaceutical Society. With regard to the cultivated plant becoming weaker in the active principle, as he had already said, he thought that depended on the conditions of cultivation, but it would be far better to have a definite cultivated form than an indefinite wild one. The strength of belladonna varied very greatly. At present dependence could not be placed on either wild or cultivated belladonna or aconite being uniform, and some method of estimating the strength must undoubtedly be adopted ultimately. He should be pleased to place at Mr. Groves's disposal a sufficient quantity of *A. paniculatum* to examine; he had tasted it, and did not find it produce the tingling sensation which the *A. Napellus* did, and if Mr. Plowman would like to corroborate that result there was a fine specimen of the plant behind him on which he could experiment. He had not himself had the opportunity of seeing the aconite growing wild on the mountains, and had to depend on the information of others, and therefore he could not say whether the specimens Mr. Martindale had seen were the true *A. Napellus*. There were a number of species which grew under different conditions, which all had blue flowers, but differed in their chemical constituents.

The Conference here adjourned for luncheon.

(*To be continued.*)

The British Association for the Advancement of Science.

FIFTY-SEVENTH ANNUAL MEETING.

THE PRESIDENT'S ADDRESS.

(*Concluded from page* 204.)

Again, there is an alternative mode for the convey ance of power by the exhaustion of air—a mode which has been in practical use for over sixty years.

We have also the curious system pursued at Schaffhausen, where quick-running ropes are driven by turbines, these being worked by the current of the river Rhine; and at New York, and in other cities of the United States, steam is laid on under the streets, so as to enable domestic steam engines to be worked, without the necessity of a boiler, a stoker, or a chimney, the steam affording also means of heating the house when needed.

Lastly, there is the sytem of transmitting power by electricity, to which I have already adverted. I was glad to learn, only the other day, that there was every hope of this power being applied to the working of an important subterranean tramway.

These distributions from central sources need, as a rule, statutory powers to enable the pipes or wires to be placed under the roads; and following the deplorable example of the Electrical Facilities Act, it is now the habit of the enlightened corporation and the enterprising town clerk of most boroughs to say to capitalists who are willing to embark their capital in the plant for the distribution of power from a central source—for their own profit, no doubt, but also, no doubt, for the good of the community—"We will oppose you in Parliament, unless you will consent that, at the end of twenty-one years, we may acquire compulsorily your property, and may do so, if it turns out to be remunerative, without other payment than that for the mere buildings and plant at that time existing." This is the way English enterprise is met, and then English engineers are taunted, by Englishmen—often by the very men who have had a share in making this "boa-constrictor" of a "Facilities Act"—that their energy is not to be compared with that which is to be found in the United States and other countries. Again, however, I must remember that I am not addressing Section F.

There is one application of science, by engineers, which is of extreme beauty and interest, and that cannot be regarded with indifference by the agriculturists of this country. I allude to the heat-withdrawing engines (I should like to say, "cold-producers," but I presume, if I did, I should be criticized), which are now so very extensively used for the importation of fresh meat, and for its storage when received here. It need hardly be said, that that which will keep cool and sweet the carcases of sheep will equally well preserve milk, and many other perishable articles of food. We have in these machines daily instances that, if you wish to make a ship's hold cold, you can do it by burning a certain quantity of coals—a paradox, if ever there was one.

In this climate of ours, where the summer has been said to consist of "three hot days and a thunderstorm," there is hardly need to make a provision for cooling our houses, although there is an undoubted need for making a provision to heat them. Nevertheless, those of us who have hot-water heating arrangements for use in the winter would be very glad indeed if, without much trouble or expense, they could turn these about, so as to utilise them for cooling their houses in summer. Mr. Loftus Perkins, so well known for his labours in the use of very high-pressure steam (600 to 1000 lbs. on the inch), and also so well known for those most useful high-pressure warming arrangements which, without disfiguring our houses by the passage of large pipes, keep them in a state of warmth and comfort throughout the winter, has lately taken up the mode of, I will say it, producing "cold" by the evaporation of ammonia, and, by improvements in detail, has succeeded in making an apparatus which, without engine or pumps, produces "cold" for some hours in succession, and requires, to put it in action, the preliminary combustion of only a few pounds of coke or a few feet of gas.

As I have said, our climate gives us but little need to provide or employ apparatus to cool our houses, but one can well imagine that the Anglo-Indian will be glad to give up his punkah for some more certain, and less draughty, mode of cooling.

I now desire to point out how, as the work of the engineer grows, his needs increase. New material, or better material of the old kind, has to be found to enable him to carry out these works of greater magnitude. At the beginning of this century, stone, brick and timber were practically the only materials employed for that which I may call standing engineering work—*i.e.*, buildings, bridges, aqueducts, and so on—while timber, cast iron, and wrought iron were for many years the only available materials for the framing and principal parts of moving machines and engines, with the occasional use of lead for the pipes and of copper for pipes and for boilers.

As regards the cast iron little was known of the science involved (or that ought to be involved) in its manufacture. It was judged of by results. It was judged of largely by the eye. It was "white," it was "mottled," it was "grey." It was known to be "fit for refining," fit for "strong castings," or fit for castings in which great fluidity in the molten metal was judged to be of more importance than strength in the finished casting. With respect to wrought iron, it was judged of by its results also. It was judged of by the place of its manufacture—but when the works of the district were unknown, the iron, on being tested, was classed as "good fibrous," although some of the very best was "steel-like," or "bad," "hot-short," or "cold-short." A particular district would produce one kind of iron, another district another kind of iron. The ore, the flux, and the fuel were all known to have influence, but to what extent was but little realized; and if there came in a new ore, or a new flux, it might well be that for months the turn-out of the works into which these novelties had been introduced would be prejudiced. Steel again—that luxury of the days of my youth—was judged by the eye. The wrought bars, made into "blister" steel by "cementation," were broken, examined, and grouped accordingly. Steel was known, no doubt, to be a compound of iron and carbon, but the importance of exactness in the percentage was but little understood, nor was it at all understood how the presence of comparatively small quantities of foreign matter might necessitate the variation of the proportions of carbon. The consequence was that anomalous results every now and then arose to confound the person who had used the steel, and falsifying the proverb "true as steel," steel became an object of distrust. Is it too much to say that Bessemer's great invention of steel made by the "converter," and that Siemens's invention of the open-hearth process, reacted on pure science, and set scientific men to investigate the laws which regulate the union of metals and metalloids?—and that the labours of these scientific men have improved the manufacture, so that steel is now thoroughly and entirely trusted? By its aid engineering works are accomplished which, without that aid, would have been simply impossible. The Forth Bridge, the big gun, the compound armour of the ironclad with its steel face, the projectile to pierce that steel face—all equally depend upon the "truth" of steel as much as does the barely visible hair spring of the chronometer, which enables the longitude of the ship in which it is carried to be ascertained. Now, what makes the difference between trustworthy and untrustworthy steel for each particular purpose? Something which, until our better sense comes to our aid, we are inclined to look upon as ridiculously insignificant—a "next-to-nothing." Setting extraneous ingredients aside, and considering only the union of iron and carbon, the question whether there shall be added or deducted one-tenth of 1 per cent. (pardon my clumsy way of using the decimal system) of carbon is a matter of great importance in the resulting quality of the steel. This is a striking practical instance of how apparently insignificant things may be of the highest importance. The variation of this fraction of a percentage may render your boiler steel untrustworthy, may make the difference between safety in a gun and danger in a gun, and may render your armour-piercing projectile unable to pierce even the thinnest wrought-iron armour.

While thus brought incidentally to the subject of guns, let me derive from it another instance of the value of small things. I have in my hand a piece of steel ribbon. It is probable that only those who are near to me can see it. Its dimensions are one-fourth by one-sixteenth of an English inch, equal to an area of one sixty-fourth of a square inch. This mode of stating the dimensions I use for the information of the ladies. To make it intelligible to my scientific friends, I must tell them that it is approximately ·00637 of a metre, by approximately ·00159 of a metre, and that its sectional area is ·0000101283 (also approximately) of a square metre. This insignificant (and speaking in reference to the greater number of my audience), practically invisible piece of material—that I can bend with my hand, and even tie into knots—is, nevertheless, not to be despised. By it one reinforces the massive and important-looking A-tube of a 9·2-inch gun, so that from that tube can be projected with safety a projectile weighing 380 pounds at a velocity, when leaving the muzzle, of between one-third and one-half of a mile in a second, and competent to traverse nearly twelve and a half miles before it touches the ground. It may be said, "What is the use of being able to fire a projectile to a distance which commonly is invisible (from some obstacle or another) to the person directing the gun?" I will suggest to you a use. Imagine a gun of this kind

placed by some enemy who, unfortunately, had invaded us, and had reached Richmond. He has the range table for his gun; he, of course, is provided with our ordnance maps, and he lays and elevates the gun at Richmond, with the object of striking, say, the Royal Exchange. Suppose he does not succeed in his exact aim. The projectile goes 100 yards to one side or to the other; or it falls 250 yards short, or passes 250 yards over; and it would be "bad shooting" indeed, in these days, if nearly every projectile which was fired did not fall somewhere within an area such as this. In this suggested parallelogram of 100,000 square yards or some 20 acres, there is some rather valuable property; and the transactions which are carried on are not unimportant. It seems to me that business would not be conducted with that calmness and coolness which are necessary for success, if, say every five minutes, a 380-pound shell fell within this area, vomiting fire, and scattering its walls in hundreds of pieces, with terrific violence, in all directions. Do not suppose I am saying that similar effects cannot be obtained from a gun where wire is not employed. They can be. But my point is, that they can also be obtained by the aid of the insignificant thing which I am holding up at this moment—this piece of steel ribbon, which looks more suitable for the framework of an umbrella.

I have already spoken to you, when considering steel as a mere alloy of iron and carbon, as to the value of even a fraction of 1 per cent. of the latter; but we know that in actual practice steel almost always contains other ingredients. One of the most prominent of these is manganese. It had for years been used, in quantities varying from a fraction of 1 per cent. up to 2·5 per cent., with advantage as regards ductility, and as regards its ability to withstand forging. A further increase was found not to augment the advantage; a still further increase was found to diminish it; and here the manufacturer stopped, and, so far as I know, the pure scientist stopped, on the very reasonable ground that the point of increased benefit appeared to have been well ascertained, and that there could be no advantage in pursuing an investigation which appeared only to result in decadence. But this is another instance of how the application of science reacts in the interest of pure science itself. One of our steel manufacturers, Mr. Hadfield, determined to pursue this apparently barren subject, and in doing so discovered this fact—that, while with the addition of manganese in excess of the limit before stated, and up to as much as 7 per cent., deterioration continued, after this latter percentage was passed improvement again set in.

Again, the effects of the addition of even the very smallest percentages of aluminium upon the steel with which it may be alloyed are very striking and very peculiar, giving to the steel alloy thus produced a very much greater hardness, and enabling it to take a much brighter and more silver-like polish. Further, the one-twentieth part of 1 per cent. of aluminium, when added to molten wrought iron, will reduce the fusing point of the whole mass some 500 degrees, and will render it extremely fluid, and thus enable wrought iron (or what are commercially known as "mitis"—castings of the most intricate character) to be produced.

No one has worked more assiduously at the question of the effect of the presence of minute quantities, even traces, of alloys with metals than Professor Roberts-Austen, and he appears, by his experiments, to be discovering a general law, governing the effect produced by the mixture of particular metals, so that in future it is to be hoped, when an alloy is, for the first time, to be attempted, it will be possible to predict with reasonable certainty what the result will be, instead of that result remaining to be discovered by experiment.

I have just, incidentally, mentioned aluminium. May I say that we engineers look forward with much interest to all processes tending to bring this metal, or its alloys, within possible commercial use?

One more instance of the effect of impurities in metals. The engineer engaged in electrical matters is compelled, in the course of his daily work, frequently to realize the importance of the "next-to-nothing." One striking instance of this is afforded by the influence which an extremely minute percentage of impurity has on the electrical conductivity of copper wire: this conductivity being in some cases reduced by as much as 50 per cent., in consequence of the admixture of that which, under other circumstances, would be looked upon as insignificant.

Reverting to the question of big guns. According to the present mode of manufacture, after we have rough-bored and turned the "A" tube (and perhaps I ought to have mentioned that by the "A" tube is meant the main piece of the gun, the innermost layer, if I may so call it, that portion which is the full length of the gun, and upon which the remainder of the gun is built up)—after, as I have said, we have rough-bored and turned this "A" tube, we heat it to a temperature lying between certain specified limits, but actually determined by the behaviour of samples previously taken, and then suddenly immerse it perpendicularly into a well some 60 feet deep, full of oil, the oil in this well being kept in a state of change by the running into it, at the bottom, of cold oil conveyed by a pipe proceeding from an elevated oil tank. In this way the steel is oil-hardened, with the result of increasing its ultimate tensile strength, and also with the result of raising its so-called elastic limit. In performing this operation, it is almost certain that injurious internal strains will be set up: strains tending to produce self-rupture of the material. Experiments have been carried out in England, by Captain Andrew Noble, and by General Maitland of the Royal Gun Factory, by General Kalakoutsky, in Russia, and also in the United States, to gauge what is the value, as represented by dimensions, of these strains, and we find that they have to be recorded in the most minute fractions of an inch, and yet, if the steel be of too "high" a quality (as it is technically called), or if there has been any want of uniformity in the oil-hardening process, these strains, unless got rid of or ameliorated by annealing, may, as I have said, result in the self-rupture of the steel.

I have spoken of the getting rid of these strains by annealing, a process requiring to be conducted with great care, so as not to prejudice the effects of the oil-hardening. But take the case of a hardened steel projectile, hardened so that it will penetrate the steel face of compound armour. In that case annealing cannot be resorted to, for the extreme hardness of the projectile must not be in the least impaired. The internal strains in these projectiles are so very grave, that for months after they are made there is no security that they will not spontaneously fracture. I have here the point of an 8-inch projectile, which projectile weighs 210 lbs.; this with others was received from the makers as long ago as March of this year, and remained an apparently perfect and sound projectile until about the middle of August—some five months after delivery—and, of course, a somewhat longer time since manufacture—and between August 6th and 8th this piece which I hold in my hand, measuring $3\frac{3}{4}$ inches by $3\frac{1}{2}$ inches, spontaneously flew off from the rest of the projectile, and has done so upon a surface of separation which, whether having regard to its beautiful regularity, or to the conclusions to be drawn from it as to the nature of the strains existing, is of the very highest scientific interest. Many other cases of self-rupture of similar projectiles have been recorded.

Another instance of the effect of the "next-to-

nothing" in the hardening and tempering or annealing of steel. As we know, the iron and the carbon (leaving other matters out of consideration) are there. The carbon is (even in tool-steel) a very small proportion of the whole. The steel may be bent, and will retain the form given to it. You heat it and plunge it in cold water; you attempt to bend it and it breaks; but if, after the plunging in cold water, you temper it by carefully reheating it, you may bring it to the condition fit either for the cutting-tool for metal, or for the cutting-tool for wood, or for the watch-spring; and these important variations of condition which are thus obtained depend upon the "next-to-nothing" in the temperature to which it is reheated, and therefore in the nature of the resulting combination of the ingredients of which the steel is composed.

Some admirable experiments were carried out on this subject by the Institution of Mechanical Engineers, with the assistance of one of our Vice-Presidents, Sir Frederick Abel, and the subject has also been dealt with by an eminent Russian writer.

There is, to my mind, another and very striking popular instance (if I may use the phrase) of the importance of attention to detail—that is, the "next-to-nothing." Consider the bicycles and tricycles of the present day—machines which afford the means of healthful exercise to thousands, and which will, probably within a very short time, prove of the very greatest possible use for military purposes. The perfection to which these machines have been brought is almost entirely due to strict attention to detail; in the selection of the material of which the machines are made; in the application of pure science (in its strictest sense) to the form and to the proportioning of the parts, and also in the arrangement of these various parts in relation the one to the other. The result is that the greatest possible strength is afforded with only the least possible weight, and that friction in working has been reduced to a minimum. All of us who remember the hobby horse of former years, and who contrast that machine with the bicycle or tricycle of the present day, realize how thoroughly satisfactory is the result of this attention to detail—this appreciation of the "next-to-nothings."

Let me give you another illustration of the importance of small things, drawn from gunnery practice.

At first sight one would be tempted to say that the density of the air on the underside of a shot must, notwithstanding its motion of descent, be so nearly the same as that of the air upon the upper side as to cause the difference to be unworthy of consideration, but we know that the projectiles from rifled guns tend to travel sideways as they pass through the air, and that the direction of their motion, whether to the right or to the left, depends on the "hand" of the rifling. We know also, that the friction against liquid or against gaseous bodies varies with the densities of these bodies, and it is believed that, minute as is the difference in density to which I have referred, it is sufficient to determine the lateral movement of the projectile. This lateral tendency must be allowed for, in these days of long ranges, in the sighting and laying of guns, if we desire accuracy of aim, at those distances at which it is to be expected our naval engagements will have to be commenced, and perhaps concluded. We can no longer afford to treat the subject as Nelson is said to have treated it, in one of his letters to the Secretary of the Admiralty, who had requested that an invention for laying guns more accurately should be tried. Nelson said he would be glad to try the invention, but that, as his mode of fighting consisted in placing his ship close alongside that of the enemy, he did not think the invention, even if it were successful, would be of much use to him.

While upon the question of guns, I am tempted to remark upon that which is by no means a small thing (for it is no less than the rotation of the earth), which in long-distance firing may demand attention, and that to an extent little suspected by the civilian.

Place the gun north and south, say in the latitude of London, and fire a 12-mile round such as I have mentioned, and it will be found that, assuming the shot were passing through a vacuum, a lateral allowance of more than 200 feet must be made to compensate for the different velocity of the circumference of the earth at 12 miles north or south of the place where the gun was fired, as compared with the velocity of the circumference of the earth at that place itself—the time of flight being in round numbers one minute.

At the risk of exciting a smile, I am about to assert that engineering has even its poetical side. I will ask you to consider with me whether there may not be true poetry in the feelings of the engineer who solves a problem such as this: Consider this rock, never visible above the surface of the tide, but making its presence known by the waves which rise around it: it has been the cause of destruction to many a noble vessel which had completed, in safety, its thousands of leagues of journey, and was within a few score miles of port; then dashed to pieces upon it? Here is this rock. On it build a lighthouse. Lay your foundations through the water, in the midst of the turmoil of the sea; make your preparations; appear to be attaining success, and find the elements are against you and that the whole of your preliminary works are ruined or destroyed in one night; but again commence, and then go on and go on until at last you conquer; your works rise above ordinary tide-level; then upon these sure foundations, obtained it may be after years of toil, erect a fair shaft, graceful as a palm and sturdy as an oak; surmount it with a light, itself the produce of the highest application of science; direct that light by the built-up lens, again involving the highest application of science; apply mechanism, so arranged that the lighthouse shall from minute to minute reveal to the anxious mariner its exact name and its position on the coast. When you have done all this, will you not be entitled to say to yourself, "It is I who have for ever rendered innocuous this rock which has been hitherto a dread source of peril"? Is there no feeling, do you think, of a poetical nature excited in the breast of the engineer who has successfully grappled with a problem such as this?

Another instance: the mouth of a broad river, or, more properly speaking, the inlet of the sea, has to be crossed at such a level as not to impede the passage of the largest ships. Except in one or two places the depth is profound, so that multiple foundations for supporting a bridge become commercially impossible, and the solution of the problem must be found by making, high in the air, a flight of span previously deemed unattainable. Is there no poetry here? Again, although the results do not strike the eye in the same manner, is there nothing of poetry in the work, that has to be thought out and achieved, when a wide river or an ocean channel has to be crossed by a subterranean passage? Works of great magnitude of this character have been performed with success, and to the benefit of those for whose use they were intended. One of the greatest and most noble of such works, encouraged, in years gone by, by the Governments of our own country and of France, has lately fallen into disfavour with an unreasoning public, who have not taken the pains to ascertain the true state of the case.

Surely it will be agreed that the promotion of ready intercourse and communication between nations constitute the very best, and most satisfactory guarantees for the preservation of peace; when the peoples of two countries come to know each other intimately, and when they, therefore, enter into closer business relations, they are less liable to be led away by panic or

by anger, and they hesitate to go to war the one with the other. It is in the interests of both that questions of difference which may arise between them should be amicably settled, and having an intimate knowledge of each other, they are less liable to misunderstand, and the mode of determination of their differences is more readily arranged. Remember, the means of ready intercourse and of communication, and the means of easy travel, are all due to the application of science by the engineer. Is not therefore his profession a beneficent one?

Further, do you not think poetical feeling will be excited in the breast of that engineer who will in the near future solve the problem (and it certainly will be solved when a sufficiently light motor is obtained) of travelling in the air—whether this solution be effected by enabling the self-suspended balloon to be propelled and directed, or perhaps, better still, by enabling not only the propulsion to be effected and the direction to be controlled, but by enabling the suspension in the air itself to be attained by mechanical means?

Take other functions of the civil engineer—functions which, after all, are of the most important character, for they contribute directly to the prevention of disease, and thereby not only prolong life, but do that which is probably more important—afford to the population a healthier life while lived.

In one town, about which I have full means of knowing, the report has just been made that in the year following the completion of a comprehensive system of sewerage, the deaths from zymotic diseases had fallen from a total of 740 per annum to a total of 372—practically one-half. Has the engineer no inward satisfaction who knows such results as these have accrued from his work?

Again, consider the magnitude and completeness of the water supply of a large town, especially a town that has to depend upon the storing-up of rain water: the prevision which takes into account, not merely the variation of the different seasons of the year, but the variation of one year from another; that, having collated all the stored-up information, determines what must be the magnitude of the reservoirs to allow for at least three consecutive dry years, such as may happen; and that finds the sites where these huge reservoirs may be safely built.

All these—and many other illustrations which I could put before you if time allowed—appear to me to afford conclusive evidence that, whether it be in the erection of the lighthouse on the lonely rock at sea; whether it be in the crossing of rivers or seas, or arms of seas, by bridges or by tunnels; whether it be the cleansing of our towns from that which is foul; whether it be the supply of pure water to every dwelling, or the distribution of light or of motive power; or whether it be in the production of the mighty ocean steamer, or in the spanning of valleys, the piercing of mountains, and affording the firm, secure road for the express train; or whether it be the encircling of the world with telegraphs—the work of the civil engineer is not of the earth earthy, is not mechanical to the exclusion of science, is not unintellectual; but is of a most beneficent nature, is consistent with true poetical feeling, and is worthy of the highest order of intellect.

ADDRESS TO THE CHEMICAL SECTION.

BY PROFESSOR WILLIAM A. TILDEN, D.SC. LOND., F.R.S., F.C.S.

A part of the duty which devolves upon the President of a Section of the British Association consists in delivering an address, and the knowledge that a pretty full liberty of choice is permitted in regard to the selection of a subject is the only source of comfort which serves to alleviate the onerous nature of the task.

It seemed to me that the time is gone by when an attempt to review progress over the whole field of chemical science is likely to be useful or even possible, and an account of what is being done within the narrow limits of those parts of the science to which I have been able to give special attention would be ill-adapted to the character of a speech addressed to the members of the Section collectively. The fact that at the last meeting of the Association a Committee was appointed to inquire into the methods at present adopted for teaching chemistry, suggested that, as I had not been able to accept an invitation to join this Committee, I might make use of this opportunity for contributing to the discussion. The first report of the Committee will be received with much interest by the Section. As might be expected, it embodies the expression of many varieties of opinion.

The existence of chemistry as a department of science not merely requiring the observation of facts that are to be made useful, but seeking in the accumulated stores of observation to discover law, is a thing of comparatively recent growth. How chemistry arose out of alchemy I need not remind you, but the connection between the study of chemistry and that of medicine, and the maintenance of this connection down to even the present generation, is illustrated by the fact that a large number of men who have become eminent as chemists began their career in the surgery or the pharmacy. Black, Davy, Berzelius, Wollaston, Wöhler, Wurtz, Andrews, and W. A. Miller began by the study of medicine, whilst Scheele, H. Rose, and the great names of Liebig and Dumas are to be found in the long roll of those who received their earliest notions of chemistry in the pharmaceutical laboratory. Chemistry has been gradually emancipated from these associations with enormous advantage to both sides. So long as technical purposes alone were held in view a scientific chemistry could not exist, but no sooner did the study take an independent form and direction than multitudes of useful applications of the facts discovered became apparent.

It is only within a comparatively few years, however, that universities, in this country, at least, have ceased to deal with chemistry as a kind of poor relation or humble follower of medicine, and have permitted her to emerge from the cellars of a museum or school of anatomy, and have given her a commodious dwelling in the fair light of day.

In the old time such instruction in chemistry as was given in the universities and mining or technical schools seems to have taken the form of lectures read by the Professor, and access to a laboratory for practical manipulation seems to have been a high privilege accorded only under exceptional circumstances to the few. We are told, for example, that when Liebig went to Paris in 1823 he applied to Gay-Lussac for practical instruction at first without success, and that admission to the laboratory of the École Polytechnique was ultimately granted him only through the intervention of Von Humboldt.

In a great many cases the student of chemistry must have been almost entirely dependent upon private study, though books were scarce and materials more costly than now. Davy, for example, seems to have had no instruction whatever previous to his appointment as assistant to Dr. Beddoes at the Pneumatic Institute at Bristol.

Doubtless, therefore, the recollection of his own early difficulties when seeking instruction contributed largely to influence Liebig in the establishment of the laboratory in the University of Giessen, and in the adoption of the principles which guided his teaching there. For the first time in the history of chemistry students met not merely to listen to the discourse of a professor concerning his own experiments and conclusions, but to examine for themselves the basis of the

theories taught, to learn the processes of analysis, and by independent investigation to extend the boundaries of existing knowledge.

The fame of the new school spread fast and far, and soon men from every part of the civilized world assembled to share in the advantages offered. The influence of the new method can be estimated when we reflect that nearly all the now passing generation of chemists in England and America obtained the greater part of their training in Liebig's laboratory; and as a large number of them have been teachers, it may be assumed that they transplanted into their own countries the methods they had learnt from the great German master.

It was not till 1846, long after the school at Giessen had risen into fame, that in England a sense of our deficiencies in respect to provision for teaching chemistry was felt strongly enough to lead to the establishment of a college of chemistry. At that time the Professor of Chemistry at Oxford was also Professor of Botany. At Cambridge it was thought praise and boast enough that the occupant of the chair of chemistry had, during more than thirty years, frequently resided at the University, and every year gave a course of lectures. The Jacksonian professorship was not then, as now, in the possession of a chemist. University College, London, had at this period a very distinguished man in the chair of chemistry, but it was only in 1848 that a commodious laboratory was provided by public subscription, raised in commemoration of the services of Dr. Birkbeck in promoting popular education. In that year Fownes was appointed to co-operate with Graham in the work of teaching, though his premature death soon after left but little time for the fulfilment of the rich promise of his earlier years. At Manchester John Owens had died in 1846, leaving the bulk of his estate for the purpose of establishing a university in Manchester, but as yet the Owens College was not.

The foundation of the College of Chemistry in 1846 was therefore an event of supreme importance in the history of chemical teaching in this country; and though at the time some dissatisfaction was expressed at the choice of the professor selected to direct the work, who, though a distinguished pupil of Liebig, was not an Englishman, all British chemists now concur in believing the choice to have been a most fortunate one. The great majority of my contemporaries having begun, continued, or ended their studies in Oxford Street, they and all who have come under Dr. Hofmann's teaching, know how vast was his capacity for work and how marvellous was the power he possessed of communicating his own enthusiasm to his pupils.

Since the time of which I have been speaking the means of instruction in science in England have multiplied enormously. In University College, London, founded in 1828, and in Owens College, Manchester, founded in 1851, not only have chairs of chemistry existed from the first, but they have been occupied by a succession of chemists of the highest eminence. But long after 1846 the whole of the serious teaching of scientific chemistry was accomplished at the College of Chemistry, and it was nigh upon twenty years before the Manchester school began to attract considerable notice.

In 1872–3 the movement set in which has resulted in the erection of colleges for higher instruction at a number of important English and Welsh towns. These, together with the pre-existent Queen's Colleges in Ireland and the Universities of more ancient foundation in the three kingdoms, are for the most part provided with pretty good laboratories and a competent staff. We have also the Normal School of Science and the Institute raised by the City and Guilds of London at South Kensington, and its Associate College at Finsbury. England is therefore at the present time as well provided with places of instruction for the study of chemistry as any country in the world.

And a very large proportion of the professors or heads of the chemical schools in the colleges and universities of the United Kingdom have shown by their own activity in research that they are qualified to give instruction of the highest kind, and are ready to train young chemists in the art as well as in the theory of their subject.

It is therefore no longer true that a student desiring to become a scientific chemist must needs choose between a single institution in London and another in Manchester, or must seek the instruction which he cannot get at home in the laboratory of a foreign university. As an element in a liberal education the position of chemistry is also considerably in advance of what it was twenty years ago.

It is nevertheless true that increased opportunities for study, a considerable supply of capable teachers and an enormous body of students have not produced such an amount of original investigation, or even of accurate analytical work, as might reasonably be expected. A full and complete explanation of all the influences which contribute to this result would be difficult; but I think the apparent inactivity of the chemical schools in this country is not generally the fault of the professors, but is chargeable in the main to the ignorance, and partly to the indifference, of the public. There exists as yet no intelligent feeling in favour of learning, nor indeed in favour of any sort of education, unless there is expectation of direct returns in the form of obvious practical results. It is this which animates the present popular movement in favour of so-called "technical" education. That part of the attention of the nation which can be spared from the contemplation of Irish affairs is concentrated upon the problem of how to make every little boy learn the rudiments of chemistry, whether he likes it or not, whilst there are comparatively few people interested in the question of how to provide means and instruction for those who are capable and desirous of attaining to a mastery of the subject. Moreover, the public have not yet grasped this truth, that, so far as chemistry is concerned, it is of very little consequence to the great metallurgical and chemical industries whether the workpeople do or do not know a little chemistry, though it is important that they should be intelligent enough to obey orders. What is wanted is that every manufacturer and manager should himself be an accomplished engineer and chemist, trained to observe, to reason, and to solve problems for himself.

In the case of chemistry this absence of sentiment in favour of concentration and thoroughness, and the demand for superficiality, if only it can be had wholesale, tells in a variety of ways. The governing bodies who control the various colleges and universities, and the public generally, cannot understand that good and useful work is being done unless it can be shown in the form of passes at examinations. Though most firmly believe in the necessity for examinations, serious mischief begins when they are regarded as the end itself, and not as mere incidents in the student's career towards the end, which should be knowledge.

In respect to chemistry, this is the disadvantage which attends the operation of such a system as that of the Science and Art Department, or of any system under which certificates in connection with individual subjects are granted on easy terms. Especial objection I also feel to such expressions as "advanced," used in reference to a particular stage, so commonly misunderstood as they are by the student and his friends, and operating against his further progress.

Reflect also upon the fact that there are only two or three colleges in this country which can boast of

more than one professor of chemistry. In nearly all cases one man is called upon to discharge the duty of teaching classes both elementary and advanced, in pure and applied chemistry, inorganic and organic, theoretical and practical. This is a kind of thing which kills specialism, and without specialists we can have not only no advance, but no efficient teaching of more than rudiments.

That teachers ought to engage in research at all is by no means clear to the public and to those representatives of the public who are charged with the administration of these new institutions. This was illustrated very painfully a few years ago by the conditions under which professors were engaged at a certain college founded, according to the declaration of its promoters, "by the people for the people," wherein it was announced in round terms that original research was not wanted, as the college was, "for the good of the many and not for the advantage of the few." This example of ignorance is only remarkable by reason of its audacity. Probably many people hold a similar view, though few are bold enough to declare it.

Without going far into the discussion of the general question, which is a large one, I may perhaps be allowed to offer a few remarks for the consideration of any of my audience who may perchance incline towards that opinion.

It is only when a teacher occupies himself with research that the most complete guarantee is given that he is interested in his subject and that he is a learner. A popular mistake consists in regarding a professor as a living embodiment of science—complete, infallible, mysterious; whereas in truth he is, or ought to be, only a senior student who devotes the greater part of his time to extending and consolidating his own knowledge for the benefit of those who come to learn of him, not only what lies within the boundaries of the known, but how to penetrate into the far greater region of the unknown. Moreover, the man who has no intellectual independence and simply accepts other people's views without challenge is pretty certain to make the stock of knowledge with which he sets out in life do service to the end. That one may be fitted to form a sound judgment concerning new theories he must be familiar with the methods by which progress is accomplished. The work of investigation then reacts beneficially upon the work of teaching; that is why teachers should be encouraged, nay, even required, to investigate, and not because their discoveries may haply prove to be practically useful.

Of course it may be said that there have been distinguished investigators who could not teach, but the converse is not true; every teacher who has attained to eminence as a teacher, who has drawn men after him, who has founded a school of thought, and has left his mark upon his generation; has been an industrious worker in research of some kind. All teachers cannot be expected to reach the same high standard, but this is the ideal after which all must strive, or fail utterly.

The fact that there is as yet little demand among schoolmasters for high attainments in chemistry is another reason why so little is accomplished in the chemical schools. Here again the public is really to blame. It is disgraceful that in all classes of schools, even where chemistry is supposed to be taught, there are but few places where serious employment is found for the well-trained chemist. I could point to several schools which claim the position of first-rate, where chemistry is taught by masters who have never studied the subject at all, but who are, I suppose, allowed the traditional "ten minutes' start" with the book. Would the head-masters of such places dare to employ a person to teach mathematics who did not know the four first rules of arithmetic, or another to teach Latin who had not even got through the accidence? I fancy not. This, however, is without exaggeration the exact parallel of the position in which chemistry is placed in the majority of schools. I have heard the excuse that there is a lack of competent teachers. Of course the demand and the supply will react upon each other. When you offer a reasonable stipend, reasonable accommodation for teaching effectively, reasonable leisure for the master's own studies, and a position on the staff not inferior to that of the classical and mathematical masters, I believe that then, but not till then, there will be as many good school teachers of chemistry as there are of other subjects.

I could point to other prominent schools where the chemistry and other branches of science are taught by a peripatetic South Kensington teacher, who arrives weekly with his box of tricks. Not long ago I was invited to distribute the prizes given in connection with the evening classes in a town not far from Birmingham, and I took the opportunity of advising the teachers present on the occasion to read. One of them said to me afterwards, "When do you suppose I can read? I am engaged in going round to my schools from nine in the morning till ten at night." People of this kind do the greater part of the so-called science teaching sustained by the Science and Art Department, and the worthy town councillors and committees who employ them think that these are the people who are going to help the British manufacturer in his struggle against foreign competition under the guidance of the highly-trained chemists from the German universities. This would be ludicrous if it were not so very serious.

There is an opportunity at the present time of correcting some of these mistakes, but no advantage is being taken of it. I refer now to the "technical schools" which are springing up everywhere. There may be a few competent teachers of chemistry employed in some of them, but I find it difficult to think of many examples. The sort of person who is put in charge of these places is usually a schoolmaster, who is allowed, sometimes even after his appointment, to get a short course of qualitative analysis in order to enable him to obtain a certificate which will entitle him to earn grants from the Science and Art Department.

And manufacturers are much to blame. Instead of employing trained chemists the greater number of those who want chemical assistance are satisfied to engage the services of boys who have been to an evening class for a winter or two.

The difficulty of finding a satisfactory career in connection with the subject also accounts for the fact which I fear must be admitted, that chemistry does not attract its due share of the intellect of the nation. Clever young men can usually do better at the law, in medicine or in commerce, than in teaching chemistry or in manufactures in which chemical skill is applicable. So badly educated are many of the young men who commence the study with professional objects in view, that it is quite impossible to teach them anything beyond routine analysis, if so much.

I heard lately from a friend of mine a story of a young groom in his employ who cannot read or write—and who declines to be taught to read on the ground that, considering himself pretty smart, he is afraid that "learning might dull him." This idea seems to be rather prevalent among certain classes of people, but I can assure those who wish to be chemists that some familiarity with the rule of three, and such a command of English as will enable them to understand words of more than one syllable, will be no obstacle to the acquisition of chemical knowledge.

Three years has hitherto been regarded as the normal period for study. The question arises, can a young man, previously well educated, expect to become an accomplished chemist, competent to apply his knowledge usefully, by giving the whole of his time to study during *three years*? I believe not.

By reason of the enormous development of the science the position of the student of chemistry is nowadays very different from what it was thirty years ago. Since that time we have not only got a few new elements, a matter of small importance in itself, but new views of the nature of the elements and of their mutual relations. This could hardly have come about but for the recognition of the law of Avogadro as a fundamental principle, upon which we rely as the ultimate criterion by which the true distinction between so-called equivalent weights and molecular ratios has been established. By the gradual evolution of ideas having reference successively to the electro-chemical relations of elements and compounds, the theory of types, and atomicity or valency, we have arrived at notions of chemical constitution based upon the hypothesis of the orderly linking together of atoms. Thirty years ago isomerism had scarcely attracted notice, and carbon compounds were only just beginning to be arranged in homologous series. The general use at the present day of the language of the molecular kinetic theory shows how deeply this theory influences our ideas of the internal constitution of matter. Within the period referred to, dissociation has been studied and a vast body of thermo-chemical data have been accumulated. And although the larger portion of the results of this work still await interpretation, dynamical ideas of chemical action are now generally accepted. We have also new methods of investigation, including spectroscopic analysis with all its vast train of results.

When I began chemistry many of these subjects and others had not been heard of. Of course we had our difficulties, and I well remember the puzzles met with in the endeavour to refer compounds to their appropriate types, also the consternation caused in the student's mind and the confusion in his note-book by the successive changes in the atomic weights of carbon, oxygen, sulphur, and the metals. But on the whole there was much less to learn.

It has always been thought essential that a student of chemistry should have some knowledge of physics. It is now more than ever necessary that this knowledge should be extensive, sound, and based upon a good foundation of mathematics. Thirty years ago a hundred pages of Fownes contained all that was thought necessary; but no one nowadays could be satisfied with that. It is now asserted that a young chemist who expects to find a career in industrial chemistry should also have learnt drawing, and more important still that he should have a good general knowledge of mechanics, steam and building construction. I suppose everyone will agree in adding French and especially German. You see how the requirements expand.

The inference from all this is that it now takes longer to make a chemist than formerly. This is a point of considerable practical importance.

My estimate that a well-educated and intelligent young man will now require five years for the study of chemistry and accessory subjects before he is likely to be of much use will not appear extravagant.

Here one may remark that in order to become a chemist it is before all things necessary to study chemistry. If the greater part of a student's time is to be taken up with other things it is not very clear how this is to be done.

A reform all round is wanted. The mathematics, modern languages, and drawing properly belong to antecedent school period, and I believe the Institute of Chemistry would greatly promote the interests of the profession, if it would impose upon candidates for the Associateship not only a three years' course of training with an examination in practical chemistry at the end, but a severe examination in mathematics, in the English, French and German languages, and perhaps drawing before matriculation or registration.

A consideration of the present position of the student of chemistry leads naturally to a review of the methods of teaching the subject. Speaking broadly, I suppose nearly all professional chemists who have had the advantage of systematic training have, up to the present time, passed through very much the same kind of course. This consists, as everybody knows, very largely of analytical work, qualitative and quantitative, preceded or followed by the preparation of a number of definite chemical compounds, besides practice in certain very necessary physical determinations, *e.g.*, relative density of solids, liquids, and gases, melting points, boiling points, and so forth. There seems now to be a disposition in some quarters to depart from this time-honoured curriculum in favour of a course in which the student is early engaged in some semblance of investigation, and in which he is encouraged to attack difficult problems, which from their fundamental importance offer considerable temptation. I venture to express a hope that this will not be carried too far. Already we are in danger of losing the art of accurate analysis. One constantly meets with young chemists who are ready enough to discuss the constitution of benzene, but who cannot make a reliable combustion. And according to my own experience attempts at research among inexperienced chemists become abortive more frequently in consequence of deficient analytical skill than from any other cause.

One modification I should gladly see generally adopted. I think an unnecessary amount of time is often spent upon qualitative mineral analysis, and an acquaintance with the properties of common and important carbon compounds ought to be acquired at an early stage. Quantitative work might with advantage be taken up much sooner than usual. By that, however, I mean serious work in which good methods are used and every effort made to secure accuracy. I do not believe in the use of rough methods because they are easy; the use of such leads the student to be satisfied with approximations, which after all he will learn soon enough is all that is possible to man. I am very glad to know that I have the support of one of my predecessors in this chair (Sir Henry Roscoe), whose opinion will carry far greater weight than mine in deprecating premature efforts to engage students in research.*

But though it does not appear to me to be wise to encourage beginners, without sufficient experience or manipulative skill, to attempt original work, one of the best possible exercises preparatory to original work is to select suitable memoirs, and not only to read them but to work conscientiously through the whole of the preparations and analyses described, following the instructions given. Many of Dr. Hofmann's papers afford excellent examples. So also do the writings of Dr. Perkin and Dr. Frankland, besides those of many other chemists which could easily be selected by the teacher.

An intelligent student, possessing the requisite preliminary knowledge, would obtain much instruction by repeating the work contained in such papers as the following, for example:—Emerson Reynolds on the missing Sulphur Urea (*J. Chem. Soc.*, 1869—i.); Fittig and Tollens on the Synthesis of Hydrocarbons of the Benzol Series (Liebig's *Annalen*, 1864, cxxxi. 303); L. Claisen and Pupils on the introduction of Acid Radicles into Ketones, &c. (*Berichte*, xx.); Lawson and Collie on the action of Heat on Salts of Tetramethyl-Ammonium (*J. Chem. Soc.*, June, 1888); Thorpe and Hambly on Manganic Trioxide (*J. Chem. Soc.*, March, 1888); besides many others, including papers on analytical processes. To such as these there might subsequently be added the determination of an atomic

* See Address to Section B, Montreal meeting.

weight on the model of one of the best masters, as a discipline which could not fail to be impressive, and full of instruction.

When chemistry is taught, not with professional or technical objects in view, but for the sake of educational effects, as an ingredient in a liberal education, the primary object is to make the pupil observe and think. But with young students it is very important to proceed slowly, for chemistry is really a very difficult subject at first, owing to the variety of strange materials with uncouth names. To reason from particulars to generals is for the unpractised always a difficult process, and in chemistry this is specially the case. With young students it is, in my experience, preferable to adopt a somewhat dogmatic style, which should of course be exchanged for a more cautious one as the pupil proceeds.

Thus the law of Avogadro can only be given at first as a recognized physical law, without much explanation, since the full apprehension of the evidence upon which it rests can only be secured at a late stage of the learner's progress. There is, of course, great advantage in the use of an inductive method if only it is employed judiciously. Otherwise the result is only confusion.

A number of papers, pamphlets and text-books have lately appeared, professing to teach the principles of the science practically and by new methods. Most of these turn out, upon inspection, to be very old methods indeed, but there is a small residue of distinctly original character which are sure to attract, as they deserve, considerable attention. The systems I refer to provide a series of problems which the pupils are called upon to solve. According to this plan the student is not allowed peaceably to examine the properties of oxygen or sulphur which he now sees for the first time. He must weigh, and measure, and observe, and then infer. All this coming at once upon the head of a beginner seems to me to be well fitted to drive him to despair.

I well remember the first experiment in chemistry I ever made. It consisted in dissolving zinc in diluted sulphuric acid in an evaporating dish, lighting with a match the bubbles of hydrogen as they rose, and afterwards leaving the solution to crystallize. I was about sixteen, and the bubbles of gas as well as the crystals I afterwards got interested me very much. If at that time I had been made to weigh the zinc and acid, and measure the hydrogen with the object of answering some question about the composition of zinc and hydrogen sulphates, I should have been pretty much in the position of a boy ignorant of geometry shut up with the propositions of Euclid and ordered to give the demonstrations.

I think when we recall such a fact as that Priestley, who discovered oxygen in 1774, failed to the end of his days to understand the process of combustion, and actually wrote, in 1800, a pamphlet in defence of "phlogiston," we ought not to be surprised when young people, though born a century later, fail to perceive at once the full significance of facts to which they are introduced for the first time. At the outset you cannot reasonably expect a young student both to observe accurately and infer justly. These two things must be kept separate at first, and for this reason among others I believe that attempts to make young students verify for themselves the fundamental propositions of chemistry will not be successful. One has only to trace the origin of one's own convictions in reference to any important fact or principle to perceive that they very seldom spring into existence suddenly, but almost always commence in vagueness and hesitation, acquiring consistency and solidity only as the result of accumulated experience.

I will not pretend to determine what may be included within the wide circle of the functions of the British Association; but I think I cannot be mistaken in assuming that the advancement of science is dependent in no small degree upon the provision for the efficient teaching of science. I have traced an outline of what has been done in the past, and have endeavoured to show in what respects I think we are deficient at the present time. No matter how ardent may be the aspirations, how earnest the endeavours of a few, progress will be slow unless they are sustained by the sympathy of the many. On one principle the public must surely insist, that only those shall be allowed to teach who know.

Parliamentary and Law Proceedings.

Selling Cotton-Seed Oil for Olive Oil.

At the Stipendiary's Police Court at Tunstall (North Staffordshire), on Thursday, Robert Featherstone, chemist and druggist, Market-square, Tunstall, was summoned by Mr. E. W. H. Knight, Inspector under the Food and Drugs Act, for having sold olive oil that was not of the nature and quality demanded.

Mr. Llewellin, who appeared for the defence, said that though a technical offence might have been committed, he did not think, when the facts of the case were heard, the Stipendiary would feel it his duty to order Featherstone to do more than pay the cost of the summons.

Evidence was then given that on July 19 an agent of the inspector's visited defendant's shop and asked to be supplied with a pint of olive oil, for which he paid 1*s*. Upon the article being analysed it was found to be pure cotton-seed oil.

It was stated for the defence that the importers of the oil had been communicated with, and at their request the sealed portion of the purchase left by the inspector's agent was forwarded to them for the purpose of having it analysed. This had been done, and there was no denying that it turned out to be cotton-seed oil. The wholesale firm who sold the article to the defendant had analysed the oil in the vessel out of which Featherstone's order should have been supplied, and it was found to be pure olive oil. Therefore, either the wholesale firm had sent cotton-seed oil in mistake for olive oil, or Featherstone's assistant had, when getting the shop supply from the warehouse stock, made a mistake and drawn it from the wrong vessel.

The Stipendiary inflicted a fine of 40*s*. and 19*s*. costs.

ANSWERS TO CORRESPONDENTS.

Erratum.—On p. 190, col. ii., line 7, in the list of delegates to the Pharmaceutical Conference from the London Chemists' Assistants' Association, *for* "C. I. Stertner" *read* "C. J. Strother."

A Victim.—The case, as described by you, seems to be one of the class usually decided in the law courts, and at present the circumstances do not seem to connect it so specially with pharmacy as to render the publication of your "warning" in this Journal necessary.

Pharmacy in California.—*Exeo* asks for information respecting the position and prospects of chemists and druggists in California, and what would be required from an English assistant there in the way of qualification.

T. G. T.—All the preparations would appear to require a stamp, as in the handbill sent they are all described as beneficial in the relief of disease.

J. F. Brown.—You are right in your supposition. The omission is rectified on p. 208.

E. J. Evans.—Lunge's 'Coal Tar and Ammonia,' a copy of which is in the Society's Library.

G. W. Loveluck.—Numerous receipts for "silvering" will be found in "Cooley" and similar works.

Communications, Letters, etc., have been received from Messrs. Maggs, Beard, Murray, Rimmington, Ward, Fletcher, Gerrard, Martin, Symes, Thresh, John, Burford, Scupham.

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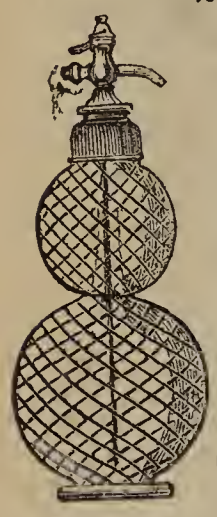

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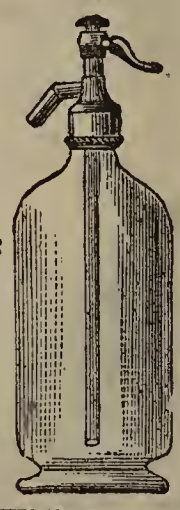

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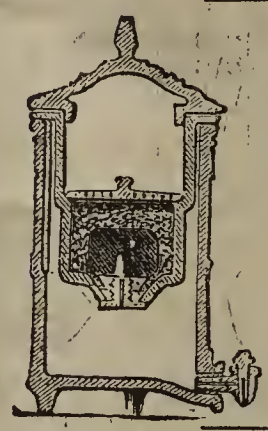

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Assistant Surgeons—Mr. Reeves; Mr. C. Mansell Moullin; Mr. Hurry Fenwick; Mr. F. S. Eve.
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Emeritus Professor of Medicine—Sir Andrew Clark, Bart., F.R.S.
Emeritus Professor of Surgery—Mr. Jonathan Hutchinson, F.R.S.

The SESSION 1888-89 will commence on Monday, October 1st, 1888. An old Student's Dinner, which will take the place of an opening ceremony, will be held in the New Library at 7.30 p.m. The Chair will be taken by Jonathan Hutchinson, Esq., F.R.S. The New Buildings, which were opened by their Royal Highnesses the Prince and Princess of Wales, on May 21st, 1887, afford more than double the accommodation which was provided formerly.

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LECTURES.

Mechanical Dentistry—Dr. Walker, M.R.C.S., L.D.S., on Wednesdays, at 5 p.m., commencing on October 3rd.
Metallurgy in its Application to Dental Purposes—Professor A. K. Huntington, F.C.S., on Tuesdays, at 12 a.m., commencing October 2nd.

The SUMMER SESSION will commence in May, 1889.

Dental Surgery and Pathology—Mr. on Tuesdays and Fridays, at 8 a.m.
Dental Anatomy and Physiology (Human and Comparative)—Mr. Arthur Underwood, M.R.C.S., L.D.S., on Wednesdays and Saturdays, at 8 a.m.

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	Dental Surgeons.	*Assist. Dental Surgeons.*
Monday, 9 a.m...	Mr. D. Hepburn ..	L. Matheson.
Tuesday ,, ..	Mr. R. Woodhouse..	Mr. W. Hern.
Wednesday ,, ..	Mr. Gregson	Mr. E. Lloyd Williams.
Thursday ,, ..	Mr. Storer Bennett..	Mr. G. Parkinson.
Friday ,, ..	Mr. Claude Rogers..	Mr. L. Read.
Saturday ,, ..	Mr. F. Canton ..	Mr. Truman.

Anæsthesists—Mr. Braine, Mr. Bailey, Mr. Bird, Mr. Mills.
Assistant-Anæsthesists—Dr. D. W. Buxton, Dr. F. Hewitt.
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Two entrance science scholarships of 125 guineas and 60*l.* respectively, open to all first-year students, will be offered for competition. The examination will be held on the 26th, 27th, and 28th September, and the subjects will be chemistry and physics, with either botany or zoology, at the option of candidates.

Special classes are held throughout the year for the "Preliminary Scientific" and "Intermediate M.B." examinations of the University of London.

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E. NETTLESHIP, Dean.

The Mason College, Birmingham.

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ALEXANDER DUNCAN, B.A.,
Secretary.

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FEES:—

MINOR.

To the October Exam....	£4	4	0.	—December..	£8 8 0
Until Qualified					£12 12 0
12 Months' (Minor and Major)					£15 15 0

MAJOR.

To the October Exam....	£3	3	0.	—December..	£6 6 0
Until Qualified					£10 10 0

The next two courses will commence on October 23rd and January 1st, entries for which can now be received.

Students can enter at any time, but are advised to commence their studies at the beginning of a course.

During the past Session, **14** Students passed the Preliminary, **140** the Minor and **12** the Major Examinations of the Pharmaceutical Society.

At the last Pharmaceutical Examinations, **8** Major Candidates from this School presented themselves, **6** passed. The following **35** Minor Students were also successful.

MAJOR.

CARTER, B. | FORSTER, J. B. | WANT, W. P.
EVANS, J. | HEATON, S. W. | WRIGHT, J.

MINOR.

ARDEN, L.	HALL, A. J.	OGLE, J. H.
BAKER, H. W.	HITCHMAN, W.	PATCHETT, J.
BELL, J. H.	HORSLEY, E. S.	PEPPERDINE, H.
BROOKS, J.	JONES, J.	REID, D.
BROWN, L.	JONES, LL.	RUTHERFORD, W.
DOUGLAS, J. W.	LANCE, W. D.	STARK, J.
EYNON, C. J.	LONGDIN, T. W.	TUDOR, W.
GLOVER, F. J.	MASTERS, H.	TURNBULL, H. J.
GOOLD, B.	MORRELL, C.	TURNER, W. H.
GRIFFITHS, H. T.	NORTHWOOD, H. G.	WEST, G. W.
HATHAWAY, F. H. W.	NORTON, T. E.	WHITWORTH, J. W.
WILKINSON, T.	WILLOWS, H. G.	

EVENING CLASSES

Are held every **Tuesday, Wednesday, Thursday** and **Friday**, from 7 till 9 p.m., in connection with the above well-known College, by which gentlemen engaged during the day, and unable to leave business in time to attend the Day Classes, may be prepared for their examinations.

The Thursday Evening Classes extend over a term of SIX WEEKS, and are intended for those students who have previously failed in the examination, or who wish to present themselves at the next examination. The course consists of six hours practical chemistry and six lectures (of one hour's duration) on the most important points in each subject. Inclusive Fee for the course, **10s. 6d.**

The Tuesday Classes are intended for students who have studied the subjects previously. The course extends over a term of three months. It includes fourteen hours practical chemistry and fourteen lectures on all the subjects required in the Minor examination. Inclusive Fee for the course, **£1 1s.**

The Wednesday Classes are intended for those who are only just commencing their studies. The course extends over a period of 12 months, and includes one hour s practical chemistry and one hour's class each evening. Fees—For the complete course, **£3 3s.**; Three months, **£1 1s.**

The Friday Classes are intended for those preparing for the Preliminary examination of the Pharmaceutical Society. Fee—Three months, **15s.**

The work is so arranged that gentlemen can enter at any time; as each student works independently, there is little or no advantage in waiting for the commencement of a course.

TRINITY SQUARE, BORO', LONDON, S.E.

Portman School of Pharmacy.

156, MARYLEBONE ROAD

(Close to Baker Street Station).

DAY AND EVENING CLASSES.

SPECIALITÈ—LESSONS IN PRACTICAL DISPENSING.

THE CITY SCHOOL OF CHEMISTRY AND PHARMACY. Estab. 1882. CELER ET CERTUS

27, ChanceryLane, London, W.C.

Day and Evening Classes at moderate fees.

Theoretical Chemistry and Physics ..	Mr. MAURICE WILLIAMS.
Practical Chemistry	Mr. H. J. SALMON, A.I.C.
Materia Medica and Botany	Mr.
Microscopy	Mr. MARTIN J. COLE.
Pharmacy	Mr MAURICE WILLIAMS.

Full particulars on application to the Secretary at the school.

PRIVATE TUTOR

Mr. JAS. W. SAUNDERS

(from the Royal School of Mines),

ASSISTANT PUBLIC ANALYST, ASSAYIST, &c.

6, ROCHESTER SQUARE, CAMDEN ROAD, N.W.

Reads with gentlemen preparing for all examinations. No classes or demonstrators, but individual personal attention. Fees moderate. Chemical and Microscopical Analyses undertaken.

Laboratory: 65, EUSTON ROAD, KING'S CROSS, N.W.

PRELIMINARY & MINOR.

ALL Students who are preparing should send for particulars of a method of study which will enable them to pass with ease. Enclose stamped envelope to Mr. J. TULLY (Hills Prizeman), Chemist, Hastings. Established 1872. References to past and present Pupils. 35 Pupils passed the last Examinations.

STUDENTS' AIDS TO EXAMINATION.

PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 3d. Cæsar Simplified, 1s. Knotty Points in Latin Grammar, 1s. 6d. MINOR.—Equations Simplified, 1s. Illegible Autographic Prescriptions, 1s. Notes on Dispensing, 1s. Prescriptions given at the Minor, 6d. CHEMIST, care of Mr. J. Edwards, Wye, Kent.

Royal Road to the B.P.

Easy, interesting and guaranteed accurate. Plasters, Infusions, Liniments, Pills, Syrups, Wines, each post free 9 stamps; Extracts, Ointments, 13 stamps. Complete, 5s.—EURETES, 25, Hemingford Road, N.

THE CENTRAL SCHOOL OF CHEMISTRY & PHARMACY

Laboratory and School Buildings:

173, 175 & 177, Marylebone Road, N.W.

EVENING CLASSES

For Minor Students will be commenced on Monday next, Sept. 10th, at 7.30, and will be continued on Wednesday and Friday Evenings at the same time.

The next Course of Lectures and Classes for the December and February Examinations will begin on Thursday, October 25th. Fees to December, 6 guineas; to February, 10 guineas.

For Prospectus, apply to

Mr. JOHN WOODLAND, 173, Marylebone Road, N.W.

FOUNDED 1868 — THE SOUTH LONDON SCHOOL OF PHARMACY LIMITED — INCORPORATED 1881

SYSTEMA OMNIA VINCIT

325, KENNINGTON ROAD, S.E.

LECTURERS:

Chemistry, Physics and Botany,
DR. MUTER, F.R.S.E., F.I.C., F.C.S.

Materia Medica and Pharmacy,
MR. DODD, F.C.S.

Analytical Chemistry,
MR. DE KONINGH, F.I.C., F.C.S.

Classics, and Mathematics and Mechanics,
MR. TOWNSEND, A.C.P. and Lond. Mat.

Assisted by an efficient staff of Demonstrators.

The fees at this School are absolutely inclusive, and there are *no extras of any kind.* The Board of Directors spare no expense in rendering the education thoroughly efficient and in maintaining the very high percentage of success uniformly obtained by the students for the last 19 years. The Dispensing department is most commodious and perfect, and *no extra charge is made for its use.*

A new Laboratory for practical instruction in Manufacturing Pharmacy is now being added to the premises.

The School being usually full, intending students should secure their places beforehand. Entries are now being made for September 12, 1888, and for January 9, 1889.

For fees, &c., apply by letter addressed to the Secretary.

PRIVATE TUITION

FOR THE MAJOR AND MINOR EXAMINATIONS.

Mr. A. D. MARKHAM, M.P.S., M.S.C.I.,
(COUNCIL MEDALLIST OF THE PHARMACEUTICAL SOCIETY)
Receives a few Pupils for the above Examinations.

Convenient **LABORATORY** open daily for instruction in ANALYTICAL CHEMISTRY. Gentlemen may enter for a course of Practical Analysis only if desired.
Office and Laboratory: **5, Denman St., London Bridge, S.E**

Pharmaceutical Preliminary, London Matriculation, Apothecaries' Hall, College of Preceptors, &c.

Mr. A. H. DAWES, 1st B.A. (Lond.),
Continues his successful preparation, privately and in class. Students rapidly prepared by Postal Tuition. Candidates coached for Bell Scholarship. Class for Pharmaceutical Prelim., Monday or Thursday, 6 till 9, £1 1s. per 13 weeks. Address, 31, Southampton Street, Strand. W.C.

APARTMENTS AND BOARD

For Bloomsbury Students, in quiet neighbourhood, half-hour from Square. Private sitting-room and home comforts. Terms moderate. References to former students.

W. H. VERNON,
Pharmaceutical Chemist, 72, Aubert Park, Highbury, N.

INDIAN MEDICAL SERVICE.

India Office, 10th September, 1888.

AN Examination for ten appointments as Surgeon in Her Majesty's Indian Medical Service will be held in London in February, 1889. Copies of the Regulations for the Examination, with information regarding the Pay and Retiring Allowances, &c., of Indian Medical Officers, may be obtained from the Military Secretary, India Office, London, S.W. The exact date of the Examination will be announced hereafter.

ALLEN JOHNSON, Lieutenant-General,
Military Secretary.

ENGAGEMENTS WANTED.

Advertisements under this heading are charged as follows—Twelve words not exceeding two lines, or less, 1s.; each additional six words, or less, 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

MANAGER or DISPENSER, Surgeon's or Chemist's, Temporary or permanent. JAMES DUNKERLY, M.P.S., 88, Morton Rd., Islington, N.

ASSISTANT. Age 26. 6 years experience. English and French. Salary no object. Time to study. Disengaged October. HARRY GELLEE, 42, Rue d'Auteuil, Paris.

ASSISTANT. Ætat 29 Good experience. W., 43, Baker St., Doncaster.

LONDON or large town. Out-door preferred. 8 years' good experience, 3 in present situation. Dispense, Prescribe. Permanency if suitable. G. HACKTHORNE, Stafford St., Walsall.

AS ASSISTANT. Out-door preferred. 10 years' first-class experience. Age 25. Good references. F. J. ATKINS, Medical Hall, Yeovil.

AS DISPENSER or ASSISTANT. Out-door preferred. Age 27. Good experience, energetic and reliable. C. B., 56, Albert Rd., Henley-on-Thames, Oxon.

WITH time for study and to attend night classes. Salary no object. 4½ years' experience. H. DAVIES, Newtown, North Wales.

ASSISTANT. Age 23. Height 5ft. 10in. 7 years' experience in high class businesses in West-end and seaside. J. T., care of Messrs. Thomas, Chemists, St. Leonards.

ENGAGEMENTS WANTED.

IMPROVER. In or near London. 3 years' experience. JUNIOR, Taylor, Chemist, Newbury.

AS MANAGER (with rooms preferred). Age 27. 13 years' experience, town and country. 2 good references as Manager for 5½ years. Passed Minor and Hall Examinations. MOORE, Bangrove, near Tewkesbury.

BEGINNING November.—By an energetic man, post of Working PARTNER, where the bringing out of own specialities would be accepted instead of capital. SPES, 43, East Hill, Wandsworth, S.W.

AS JUNIOR. Age 21. Height 5ft. 10in. Good references. Disengaged. X., 49, Penrose St., Walworth Rd., S.E.

ASSISTANT or MANAGER. Thoroughly experienced in good class business. Age 28. Qualified. Unexceptionable references. HINES, Havelock Rd., Norwich.

JUNIOR. Age 21. 7 years' experience. Extract Teeth. Disengaged. 2, Eden St., Kettering.

DISPENSER. 16 years with M.D. Highest references. J. F., 49, Upper Bangor, Wales.

ASSISTANT. 23. 8 years' experience. Abstainer. 2 years in last situation. MERCER, 28, Moira St., Liverpool.

AS JUNIOR or IMPROVER, in good class Dispensing business. B. OWENS, Bewdley.

LOCUM TENENS. Qualified. Good Dispenser. Tall, teetotaler. HALL ROBERTS, Holbein House, Folkestone.

TEMPORARY. Qualified. Moderate terms. Town or Country. 73, Shakespere Rd., Stoke Newington.

ASSISTANT or BRANCH MANAGER. Age 28. Tall. Experienced. BROWN, 3, Camden Rd.

IMPROVER. Would give first 3 months. 2½ years' experience. W. S., Mr. Hodder, Montacute, Ilminster.

AS MANAGER. Qualified. Middle-aged. Married; no family. Disengaged shortly. PHARM., Wright, Layman & Umney, Southwark St.

ASSISTANT. Part or full time. Qualified. H. F., 9, Swaby Rd., Wandsworth Common.

AS DISPENSER, CHEMIST, or SURGEON. Out-door. Age 25. 11 years' experience. Particulars to STAFFORD, Broad St., Welshpool.

ASSISTANT or Branch MANAGER. Age 24. Prescriber Tooth Extractor. Yorkshire preferred. Excellent reference. LEWIS, Market Pl., Thorne, Doncaster.

DISPENSER, to Surgeon. Disengaged. September 27. B., Merton Pharmacy, South Wimbledon.

ASSISTANT. 8 years' experience. Height 5ft. 5in. Disengaged. 5th ult. HOWARD, 31, Standish St., Burnley, Lancs.

JUNIOR. 20. Height 5ft. 7in. 4½ years' experience. Disengaged, about September 28. H. L., Hill's Court House, Exeter.

BY Chemist. Qualified. Married, no family. 15 years' experience. No objection to go abroad. J. H., Messrs. Wright, Layman & Umney, 50, Southwark St., S.E.

ASSISTANT or DISPENSER, not afraid of work. Permanency desired. Age 27. 12 years varied experience. 4 years in last situation. MANAGER, Rickard, Chemist, Filey.

ASSISTANT. In-doors. Immediately. Been out of business for last 2 years. Qualified. Age 27. Low salary. STATIM, 36, Lower Kennington Lane, London.

AS MANAGER or TEMPORARY. Experienced. Position of trust. Sea-side preferred. W. G. PENRHYN, Colwyn Bay, N. Wales.

ENGAGEMENTS WANTED.

TEMPORARY. Disengaged October 1. G. HAROLD, 3, High St., Clapham, S.W.

BRANCH MANAGER or ASSISTANT. Good and varied experience. Now disengaged. Or Temporary. P. G. B., 1, Greville Rd., Kilburn.

ASSISTANT or DISPENSER. Permanent or temporary. Age 24. Good varied experience. Excellent references. CHEMIST, 311, Goswell Rd., E.C.

DISPENSER or ASSISTANT. Surgeon's or Chemist's. Temporary or Permanent. Unquestionable references. W. M., 20, Princes St., Landport, Hants.

JUNIOR. 22. Height 5ft. 8in. Accustomed to a good class trade. Can extract teeth. Abstainer. E. F. UREN, Hayle, Cornwall.

ASSISTANT or DISPENSER. Minor qualification Age 24. Leeds or neighbourhood preferred. Disengaged October 1st. T. PRESTON, Chapeltown, Leeds.

OUT-DOOR. Age 28. Good experience and references. ASSISTANT, 24, Westwell St., Plymouth.

ASSISTANT. Over 5 years' experience. Age 21. OMEGA, 11, Pelham St., Lincoln.

JUNIOR. 22. 4½ years' high class experience. Disengaged. STUDENT, Gwalchmai, Holyhead.

IN good class business. Age 24. 7 years' London and continental experience. Speaks French and German. References. QUINQUINA, chez Mr. Bastide, 18, Rue Marbeuf, Paris.

ASSISTANT in good class business. Age 25. Good references. Abstainer. Disengaged October 5th. ASSISTANT, 50, George St., Richmond, Surrey.

OUT-DOOR ASSISTANT. Aged 23. Tall. Good experience. F. T., 67, Russell St., Peterboro'.

AS ASSISTANT. 5 years' country experience. Speaks French. Age 22. ALPHA, 51, Florence Rd., Stroud Green, London.

OCTOBER 1st.—ASSISTANT. 25. Qualified. 10 years' town and country experience. Excellent references. London preferred. MCCORQUODALE, Amersham, Bucks.

EVENING Employment. Can take charge. MINOR, 125, St. George's Rd., S.E.

DISPENSER. Locum tenens or permanent. Registered. Disengaged first week in October. N. B., 40, Seymour St., N.W.

AS JUNIOR. Qualified. With good Dispensing experience. BAGSHAW, 87, Regent St., Leamington.

AS MANAGER or Branch MANAGER. Age 28. Married; no family. Qualified. Good Prescriber and Dispenser. Can Extract. Thoroughly competent. In or near London. To live on premises preferred. Five years' reference as manager. Good testimonials. Moderate salary. F. S. R., 47, St. Nicholas, Ipswich.

ASSISTANTS WANTED.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

IMPROVER, with slight experience. Abstainer. Required for Surgeon's Retail. In-door. Ample time for reading. One who has completed apprenticeship will do. Age under 21. Apply by letter only, giving reference, stating salary, to C., 20, Vereker Rd., West Kensington, S.W.

ASSISTANT, to Manage a small Mixed country business. Apply, with usual particulars, to JOHN, Chemist, Langharne, St. Clears.

ASSISTANTS WANTED.

A QUALIFIED APOTHECARY to take charge of a Pharmacy in a foreign city. Knowledge of French indispensable. Apply, H. G., Langstone Lodge, Brandon Rd., Southsea.

A YOUNG man studying for Minor and open to fill part time up from 3 to 8 p.m., salary £20, can apply to H., 12, Canonbury Pl., Canonbury Sq., N.

MANAGER for Dispensing, Prescribing and general Retail business. Every encouragement to active and competent young man. Written applications (with references) only considered, addressed, VACANCY, care of Ismay & Sons, Wholesale Druggists, Newcastle-on-Tyne.

A GOOD active JUNIOR that can be well recommended. If able to Extract Teeth preferred. Apply, stating age, experience, salary, and enclose photo if convenient, to BOWLING, Chemist, Pembroke Dock.

FOR South America.—Young PHARMACUTIST, certified, 20 to 25 years of age. Roman Catholic, and one speaking Spanish preferred. Apply, by letter only, to G. C. S., 135, Edmund St., Birmingham.

ASSISTANT. Minor qualification. Single. Age about 25. Accustomed to Prescribing and good general business. In-doors. D., 244, Westminster Bridge Rd., London, S.E.

QUALIFIED ASSISTANT. Age about 24. Good Counterman and Dispenser, and accustomed to a good class country business. Junior kept. Apply, stating age, height, salary, references, and enclose photo to RAE, Chemist, Newmarket.

PARIS.—Junior ASSISTANT. Qualified. In-doors. Apply personally, WILCOX & Co., 239, Oxford St., London.

DISPENSER wanted. Qualified preferred. Would be required to sleep in the house and board out. Apply, stating salary required, to CHEMIST, 74, New Bond St., London.

N. JEFFREY & SON, Cheltenham, require a good ASSISTANT. One only kept. State qualification and salary. Age about 24. Abstainer preferred. Letters not answered in 3 days declined.

DISPENSER and BOOK-KEEPER.—Wanted by a firm of Surgeons near London, a young man as above. Situation suitable to one desirous of entering the Medical profession. One year spent as above counting as a year's professional study. Small salary. Out-door. Apply, Messrs. WRIGHT & MACKENZIE, Romford.

AN English ASSISTANT who can speak French for a town in the south of France. Apply to BARRON, HARVEYS & Co., Giltspur St., E.C.

AN in-door ASSISTANT of good address. Must be well up in his business and accustomed to good class trade. State age, height, salary required, when disengaged, how long in last situation, also enclose carte, which shall be returned. MORGAN, Chemist, Southend-on-Sea.

A QUALIFIED MANAGER required, who is able to invest £200 or £300 in an old-established profitable business in the north. Applicants to be over 30, and to have had good experience. Address, LUX, care of Messrs. ISMAY & SONS, Wholesale Druggists, Newcastle-on-Tyne.

OCT. 4th.—A trustworthy JUNIOR, competent to take charge in absence of principal. Good address indispensable. Plenty time for study. Salary. Carte and references to B. BANKS, Chemist, Folkestone.

JUNIOR (Sept. 29) accustomed to a good Dispensing business, and of steady habits. Time allowed for study. Personal application preferred, or, if by letter, enclose photo (to be returned), stating age, height, and salary required, to H. TAYLOR, 39, Ledbury Rd., Bayswater, W.

ASSISTANTS WANTED.

READING Union.—Dispenser wanted.—The Guardians of the Reading Union are desirous of receiving applications for the appointment of Dispenser for the Union. Salary £85 per annum. The person elected must devote sufficient time daily for the efficient discharge of his duties, and conform to all regulations of the Local Government Board. The hours of attendance to be regulated and sanctioned by the Board of Guardians. Candidates must be Licentiates of the Apothecaries' Company of London, or duly registered under the Pharmacy Act, 1868, or some other authority of law on that behalf. Preference will be given to persons who have passed either a Minor or Major examination of the Pharmaceutical Society of Great Britain. Letters of application endorsed "Dispenser," and accompanied by evidence of qualifications, and recent testimonials, must be sent to my office on or before Wednesday, the 19th day of September, 1888. Selected candidates will receive notice to attend the Board on the day of election.—By order,

Chas. Kift, Clerk.

Union Offices, Friar St., Reading, August 23rd, 1888.

WEST London Hospital, Hammersmith Rd., W.—Wanted, an Assistant Dispenser, Minor qualification, age 21, and not exceeding 30 years. Salary £92 per annum. Applications with copies only of testimonials to reach the Secretary on or before Thursday, 20th inst. Candidates must appear before Committee without further notice on Monday, September 24th, at 10.30 a.m. R. J. Gilbert, Secretary, Superintendent.

ASSISTANT, about 25, in-doors, for cash business, N.W. Apply, stating experience, salary, &c., with carte, to J., Messrs. Hodgkinsons & Co., 198, Upper Whitecross St., E.C.

AN Assistant to take charge of Drug counter, and occasionally assist at oil and colour counter. Mr. Francis, Chemist, &c., 7, Manchester Rd., Burnley, Lancashire.

MESSRS. CUBLEY & PRESTON, Sheffield, will require a Minor man early in October, to take part in dispensing and at the counter. Outdoor. Applicants will please state qualifications, salary, &c.

A JUNIOR or Improver for a good class mixed business. Must have knowledge of Dispensing. Enclose photo, with usual particulars and terms, indoor. Apply Pharmacist, care of Messrs. Hodgkinson & Co., Upper Whitecross St., London.

IMMEDIATELY.—An Assistant of good address. Active and capable of Managing general Retail business. No Oil trade. Only one kept. Liberal salary and time for study. Apply with all particulars, to Mr. Fitt, Pharmaceutical Chemist, Barking, Essex.

ASSISTANT for London Retail Branch, permanency, of strictly steady habits, and good counterman. Apartments without board. State terms, references, age, &c., and when disengaged, to X. O., Messrs. Meggeson & Co., Miles Lane, Upper Thames St., E.C. Also a good vacancy for study.

JUNIOR or Improver to assist in a light Retail and Dispense for a Surgeon. Apply by letter only, stating terms and experience. W. R., 118, College St., N.W.

A COMPETENT Assistant, of good address and obliging business habits. Not under 23 years of age. Must be an accurate Dispenser and good Counterman. State age, height, and salary required, with references, enclosing carte (to be returned), to W., care of Barclay & Sons, Limited, 95, Farringdon St., London, E.C.

ROBSON & SON, Scarboro', are in want of an outdoor Assistant, used to Mixed Country trade, permanent, and about 27. Applicants are requested to send photo, name, salary and usual particulars. No Sunday work.

ASSISTANTS WANTED.

PHILLIPS & WORTS, Ealing, W., require an Assistant. Qualified, and accustomed to Dispensing. Two hours daily at Hospital Dispensary. Applicants please send age, height, experience, salary, and photo, to be returned.

OUT-DOOR, beginning of October, a competent, thoroughly trustworthy Assistant, unmarried, of steady habits, active and obliging, not under 23, in a good class of business. Hours moderate. No Sunday duty. State age, height, salary, reference, &c., with photo., to be returned. Samuel Goss, Pharmaceutical Chemist, Barnstaple, Devon.

COMPETENT trustworthy Assistant. Provincial town. Mixed business and to travel one day per week. Salary, indoor, £25, in addition to liberal commission on all orders obtained. First rate income guaranteed to good man, and no others need apply. Send fullest particulars and photo, Cheshire, care of Messrs. Sanger, 489, Oxford St.

JUNIOR Assistant. Indoors. Thoroughly steady and of energetic business habits. A good prescriber and able to extract teeth. Apply (enclose carte, to be returned), with full particulars as to age, height, salary required, with references, to Matthews, Chemist & Dentist, Royston, Herts.

CLARE & HUNT, Scarborough, require an experienced Junior Assistant. Accustomed to Dispensing and high class retail. Apply stating usual particulars, and enclosing photograph.

ASSISTANT. About 22 years of age. Must be a good Dispenser, and well up in the Retail and Prescribing. Apply, stating full particulars, and enclosing carte, to I. Smithson, Dispensing Chemist, Brighton.

A THOROUGHLY competent Assistant. One who has been accustomed to a good Dispensing and Family business. Apply, stating age, height, salary required, and previous engagements, to Pharmacist, care of Evans, Sons & Company, Liverpool.

BUSINESSES FOR DISPOSAL.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

PLYMOUTH, Devon.—An old-established Prescribing and Dispensing Business, in one of the principal streets. Returns about £500 per annum. Capable of great increase. At present under a manager. Very good reasons for disposal. A reasonable offer treated with. For further particulars apply, 97, Union St., Plymouth.

FOR immediate disposal through illness, profitable Mixed country Business. Post Office attached. Established 50 years. Returns past 3 years, £500. Books can be inspected by bonâ fide purchaser. Good house, part could be let if desired. Apply, Vendor, 17, Well Lane, Rockferry, Birkenhead.

LIGHT Retail and Dispensing Business in growing town near London. Good fittings and heavily stocked. Returns £450 to £500 under management. Price £375. No agents. Apply, A. B., care of Messrs. Hearon, Squire & Francis, 5, Coleman St., E.C.

A BARGAIN.—Light Retail and Dispensing Business in the Midland counties, in a village of over 3000 inhabitants. No opposition within 4 miles. Trade £400, which can be largely increased. Price £250. Stock and fixtures worth the money. Rent £16 10s. no rates or taxes. Only wants seeing. F. D., care of Evans & Co., 60, Bartholomew Close, London.

BUSINESSES FOR DISPOSAL.

DEATH vacancy.—Chemist and DENTAL. Old-established. West of England. Now returning under management £700. Full prices. More than half profit, third Dentistry. Splendidly fitted, heavily stocked. Commanding corner, main street. Large and convenient house, good back premises. Rent £45. Opposition slight. Very large business can be done under personal management. £600, or first reasonable offer. Must be sold. Every investigation. 6, Silver St., Trowbridge, Wilts.

IN N.W. district. Opened about 4 years. Doing good nucleus under management of assistant. Principally Dispensing, but personal attention required, and would increase rapidly. Large convenient house, greater part of rent let off, and ample room left for incoming tenant. Shop most handsomely fitted, well stocked. Price £450. No agents. Address, A. B., Messrs. Hodgkinsons, Treacher & Clarke, 198, Upper Whitecross St.

£475.—Unopposed. Light Retail, Dispensing and Prescribing BUSINESS. 11 miles from Marble Arch. Making a net profit of £250 a year, capable of increase. Rent £35. Valuable lease. Well fitted, heavily stocked. As immediate sale is desired no goodwill is asked. Guaranteed genuine and reliable. References given. Apply to VENDOR, 63, Weston Park, Hornsey, N.

WORTH notice.—London, W. Genuine light Retail, Dispensing and Prescribing ready-money BUSINESS. Full prices with excellent profits. Good house. Healthy locality. Most satisfactory reasons for leaving. Present owner 11 years. Will bear the strictest investigation. £900 cash. Apply, J. H., at Burgess, Willows, 101, High Holborn, W.C.; or Sanger & Sons, 489, Oxford St., W.

LANCASHIRE.—An old-established good general Mixed BUSINESS, well situated in the best part of a good town in the north-eastern division, to be disposed of only on account of ill-health. Rent £45. Returns, 1886, £840; in 1887, £946. Price to an immediate cash purchaser, £600. Apply to A. M. HUGILL, care of R. Sumner & Co., Wholesale Druggists, Liverpool.

ON Cheshire side of Mersey, opposite Liverpool.—An old-established good class Dispensing and light RETAIL, with lucrative post office and Gilbey's agency. Returns £1300. Good house. Rent £55. Price £700. Corner shop, best position. Well fitted and stocked. Residential neighbourhood. Apply, Mr. BAKER, Stockbridge Ter., S.W.

MR. G. B. CROCKER,
Valuer, Transfer Agent & Accountant,
15, WALBROOK, E.C.

KENT.—Market town, near London. Good class Retail and DISPENSING. Returns £900. Price £650. Handsome Pharmacy. Exceptionally good house. A sound investment.

SURREY.—High class Dispensing TRADE. Well situate in a busy town within one hour's ride of London. Returns £1200. Price £1000.

BUCKS.—An old established country BUSINESS. Returns £1200. Price £1200. Worth attention.

WILTS.—Light Retail and DISPENSING, in pleasant market town. Returns £600. Very profitable. Price £550. Good house and garden. Valuable stock.

LONDON, W.—Good class Retail and DISPENSING. Returns £650. Price £550. Rent £50.

LONDON, S.W.—Cash Prescribing TRADE. Returns £300. Price £100 net. Rent £20.

LONDON, S.E.—Good class Retail and DISPENSING. Returns £1000. Net profit £400. Price £850.

Valuations for Probate or Transfer conducted in any part of the United Kingdom. Terms on application.

PARSON C. BAKER,
8, Stockbridge Terrace, Victoria Station, S.W.

1.	DURHAM ...	Returns	£1650.	Rent	£75.	Price £1000.
2.	CHESHIRE ...	,,	1300.	,,	55.	,, 700.
3.	STAFFORDSHIRE	,,	1200.	,,	60.	,, 1150.
4.	KENT ...	,,	1000.	,,	60.	,, 600.
5.	KENT COAST	,,	1000.	,,	45.	,, 750.
6.	LONDON, S.W.	,,	620.	,,	60.	,, 525.
7.	SUNDERLAND	,,	500.	,,	50.	,, 400.
8.	BIRMINGHAM	,,	500.	,,	40.	,, 300.
9.	ISLE OF MAN	,,	500.	,,	50.	,, 450.
10.	LINCOLNSHIRE	,,	500.	,,	45.	,, 250.
11.	WEST BROMWICH	,,	400.	,,	50.	,, 250.
12.	GUERNSEY ...	,,	385.	,,	40.	,, 300.
13.	LEYTONSTONE	,,	240.	,,	40.	,, 225.

Some of above, newly established, increasing rapidly.

12FT. wall-fixture, drawers, lockers, shelving, cupboards, and cornice, £8 10s.; 16ft. wall-fixture, mahogany, silvered plate-glass cupboards between shelving, glass labels and glass knobs to drawers; several others; 9ft. wall-case; a number of solid mahogany-top counters, framed and moulded, pine stained and polished fronts, from 5ft. to 12ft. long, at 6s. per foot run; also a number of black and gold fronted counters, with mahogany tops, at 6s. per foot run; a plate-glass case-fronted counter, 12ft. long, £9 10s.—E. NATALI, 207, Old Street, E.C.

All numbers refer to Maw's Illustrated List.—8ft. wall-case, A 88, £27; upright case, fig. A 4, £5 10s.; plate-glass shelves; show stand, 3ft. 6in. long, 60s.; 14ft. mahogany-fronted counter, £9; 4ft. plate-glass case-fronted ditto, 70s.; 3ft. plate-glass counter-case, A 17, 55s.; 6ft. 9in. long ditto ditto, 20in. wide, £6 10s.; 3ft. bevel-fronted ditto, 35s.; 4ft. plate-glass ditto, as Maw's A 13, 50s.; 5ft. 6in. ditto ditto, 23in. wide, £5 10s.; 5ft. 6in. ditto ditto, as fig. A 3, 60s.—E. NATALI, 207, Old Street, London, E.C.

Plate-glass sponge-cases, fig. A 41, 65s.; ditto, ditto, as fig. A 43, 95s.; show-steps, A 37, 50s., as fig. A 39, 15s.; desk and glass case, A 31, 60s.; a ditto, ditto, 50s.; a number of dispensing screens, from 5ft. to 8ft. long, glass case at each side, with silvered plate-glass in centre and marble slab in front, tablets on top of cases and shelves at back for dispensing bottles, very elaborate, from £6 10s.; a 3ft. ditto, as fig. A 54, 45s.; 3ft. 6in. ditto, 55s.; 4ft. ditto, ditto, 60s.; 4ft. 10in. ditto, 70s.; 5ft., as fig. A 55, 95s.; 6ft. ditto, £5 10s.; 6ft. 6in. ditto, £6; 7ft. ditto, £6 10s.; and a quantity of other screens very cheap; several pair specie jars, royal arms, equal to new, from 24in., price £4; carboys, 16 gallons, with mahogany stands; 3 4-gallon carboys, 10s. each; dome-covered pink ointment jars, gold labelled, any names, 3s. 9d. each; a lot of second-hand green, blue, 3 and 4 lb.; ½-gall. displacement apparatus, fig. 53; black store bottles, with japanned caps, 1s. 3d. each.—E. NATALI, 207, Old Street, London, E.C.

A number of flat glass cases, various sizes, from 2ft. 6in. to 6ft. long, as fig. 2, to open at back, to be sold very cheap to make room; also a number as fig. 3—2ft. long, 30s.; 2ft. 6in. long, 32s.; 2ft. 8in. long, 35s.; 3ft. long, 40s.; 3ft. 6in. long, 45s.; as fig. A 8, 5ft. long, 95s.; 6ft. long, £5 10s.; as fig. A 15, 8ft. long, £7; 5ft. long, £4 10s.; as fig. A 16, 3ft. long, 55s.; 3ft. 6in. long, 60s.; 3ft. 9in. long, 65s.; 4ft. long, 70s.; as fig. A 17, 4ft. long, 75s.; as fig. A 18, 5ft. long, £5; 6ft. long, £5 10s.; tooth brush cases, as fig. A 9, 35s.; as fig. A 10, 50s.—E. NATALI, 207, Old Street, London, E C.

PIANOFORTE.—Gentleman must SELL his magnificent 65 guinea walnut and gold upright iron GRAND at once. Is full overstrung trichord throughout, seven octaves, repeater check action, grand rich tone, and all latest improvements; new this year. Sacrifice for 26 guineas. Maker's 15 years' warranty transferred. Approval, carriage paid. B., 363, Clapham Road, S.W.

F. J. BRETT,
VALUER, LEICESTER,
60, ST. STEPHEN'S ROAD.

VALUATIONS.—It is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.

Probate and Fire Insurance valuations.

BANKRUPTS' STOCKS BOUGHT.

CORNWALL.—Through illness, vendor is reluctantly compelled to sell his light Retail, Dispensing and Prescribing BUSINESS. Returns £450, and increasing. Agency nearly pays rent. Good house. No opposition. Town is in season frequented by visitors, and improving. Price £300.

LEICESTERSHIRE.—Unopposed RETAIL. Population 2500. Present returns £4 week. Light Retail business. Can with proper attention be doubled. Rent and taxes £20. Good house. Large and productive garden. Price £150.

NOTTINGHAM.—Old-established light Retail and PRESCRIBING. Very profitable. Returns about £800. Low rent. Price £400.

ESSEX.—Old-established Retail and AGRICULTURAL, in good market town. Returns £1750. Goodwill reasonable. Valuation about £700.

DURHAM COUNTY.—Light Retail, Prescribing, and good SPECIALITIES. Returns £900. Valuation only about £500.

Vendors of good class Concerns can be at once supplied with Partners or Buyers, as F. J. Brett has buyers prepared to invest from £1500 to £3000.

Transfers, Valuations and Auctions conducted throughout the United Kingdom by Mr. BRETT, Leicester.

IMPORTANT.—SALE BY TENDER.

F. J. BRETT, Leicester, is instructed by the owner, Mr. J. ASHER, 15, Market Pl., Driffield, who is retiring, to sell by tender, in one lot, as a going concern, the old established BUSINESS as now and for the last 10 years successfully carried on by Mr. Asher. The business is a good Country Retail, Family, Prescribing, and Agricultural Trade, with Mineral Waters. There are several Proprietary Articles in good local demand. The town is very healthy, and in the centre of one of the best Agricultural districts in Yorkshire. The house and shop are large, with extensive premises. Tenders opened Wednesday, September 19th, 1888. Tender forms and all further particulars can be had of F. J. BRETT, Valuer, 60, St. Stephen's Rd., Leicester.

Messrs. BERDOE & CO.
Transfer Agents and Trade Valuers,
30, JEWRY STREET, ALDGATE, CITY.
Established 1870.

SURREY.—Owner retiring. Retail and DISPENSING. Returns £1000. Good house; garden. Price £850.

BERKS.—Good class DISPENSING, with Dentistry. Returns £1800. Net profit £700. Price £1500.

SOMERSET.—First-class DISPENSING. Returns £950. Full prices. Price £750. Worth attention.

MIDLANDS.—Good class RETAIL. Returns £750, by Assistant. Formerly £1000. Price £400.

HOME COUNTY.—Retail and PRESCRIBING. Returns £550. Net profit £250. Rent £32. Price £400.

LONDON, S.W.—8 miles out. Retail and PRESCRIBING. Returns £550. Price £350, or offer.

S.E.—Rising new suburb. Returns £5 weekly. Rent £35. Good house; garden. Price £110.

Particulars of above and others free on application.

CHEMISTS' TRANSFERS.

32, LUDGATE HILL, LONDON.

MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

VENDORS have the advantage of obtaining an opinion on Value, derived from extensive experience, and are in most cases enabled to avoid an infinity of trouble by making a selection from a list of applicants for purchase, with the view of submitting confidential particulars to those alone who are most likely to possess business qualifications and adequate means for investment.

PURCHASERS who desire early information regarding eligible opportunities for entering business will greatly facilitate their object by describing clearly the class of connection they wish to obtain.

N.B.—No Charge to Purchasers.

Messrs. ORRIDGE & CO. are instructed to transfer :—

1. £700.—LONDON, N.—Main road. Retail and Family BUSINESS. Returns have been over £700, with good profits, decreased lately through neglect. Large, attractive shop, fitted in mahogany, and good stock. Good house. Business must be sold. Any reasonable offer will be accepted.
2. £700.—LONDON, N.W.—Dispensing and RETAIL of good class, with Post Office attached. Well fitted shop and good stock. Returns nearly £700. Good eight-roomed house, private entrance. Price £500, part of which may be paid by instalments.
3. £3000.—MIDLANDS.—Very old-established Chemist and Grocery BUSINESS. Held by vendor over 30 years. Returns nearly £3000. Net profits over £550 yearly. Large, double-fronted corner shop good house, &c., attached. Terms, £350 goodwil, and valuation. Business well suited for Partnership ! Full particulars on receipt of reference.
4. £1500.—SUFFOLK.—Good market town. First-class Retail and Dispensing BUSINESS. Returning at present at the rate of £1500 yearly. Net profits above the average. Handsomely fitted shop, fairly stocked, &c. Good house; attractive garden, greenhouses, &c. Terms, £200 goodwill and valuation of stock and fixtures. References required.
5. £625.—GLOUCESTERSHIRE.—Good town. First-class BUSINESS, Retail and Dispensing. Returns last year £625, with good profits. Large, handsome shop, double-fronted. Well stocked. Price £625. Worth attention.

Personal applicants receive Messrs. O. & Co.'s direct attention and advice, where required, free.

VALUATIONS.

Terms for valuation on application.

Appointments by post or wire have immediate attention.

ORRIDGE & CO.
32, Ludgate Hill, E.C.

HIGHEST AWARD AT AMERICAN EXHIBITION, LONDON.
SILVER MEDAL (1st Prize), NEWCASTLE EXHIBITION.
BESIDES MANY AWARDS AT PREVIOUS EXHIBITIONS.

ARTICLES WHICH PAY TO INTRODUCE

Because they are of the very best quality, and are put up most attractively, special samples and circulars being supplied for distribution.

The large demand in Great Britain for Colgate's Cashmere Bouquet Soap which has arisen in a very short time is the more remarkable because it has been created solely through the drug trade, without any newspaper advertisements.

The quality of the Soap, its handsome appearance and delightful perfume, make it sell on sight, while the distribution of the samples brings the customers promptly to the chemists who send them out.

See letter, "The Bright Side," in THE CHEMIST AND DRUGGIST, Nov. 5, 1887, p. 590; also Nov. 12, 1887, pp. 611 and 624.

Note opinion of THE CHEMIST AND DRUGGIST, Sept. 17, 1887.

A NEW SOAP.—The soap trade of chemists has greatly dimlnished, and has almost vanished so far as the lower qualities are concerned. The only chance for maintaining the returns from this department is to place novelties of a high-class character before customers, and we should think that there will be considerable satisfaction in introducing the Cashmere bouquet soap made by Messrs. Colgate & Co., of New York. This is a cream-coloured soap in oval tablets; it is remarkably pure and high-scented, and is put up in neat half-dozen boxes, with several elegant and artistic show cards. The agents, Messrs. Burroughs, Wellcome & Co., inform us that a liberal supply of sample tablets (one-fourth the regular size) are presented to the retailer, so that sales may be facilitated. It is the favourite soap in the "States."

THOUGH NOT A CHEAP SOAP,

Quality considered, Colgate's Cashmere Bouquet Soap is the best value in the market. It is made from a special stock which is not employed by any other soap maker in the world. Being fully matured *it lasts longer* and lathers as well as any fancy soap in the market.

SAMPLES—SPECIAL OFFER.

Until further notice, with each dozen of Colgate's Cashmere Bouquet Soap ordered of us, or through the wholesale houses, we will supply 1 doz. samples for free distribution if a request for same be made on order. The samples are one-fourth the size of the regular soap and are much appreciated by all who receive them.

With large orders we will supply special circulars to accompany samples bearing chemist's name and address only. Colgate's Cashmere Bouquet Soap has the largest sale of any superfine toilet soap.

Price, retail, 1s. 3d.; per dozen, 10s.; per gross, 110s. nett.

ORDER AT ONCE. IT WILL PAY YOU TO DO SO.

COLGATE'S
Cashmere Bouquet Perfume.

This exquisite odour, like that of the soap, is as distinctive as it is delicate and lasting. It is exceeding popular with the *élite* of society wherever it becomes known.

Prices: 1 oz., 2s. 6d. retail; 22s. doz.; 21s. 3d. doz. in gross lots.
2 oz., 4s. retail; 30s. 9d. doz.; 29s. 7d. ,, ,, ,,

Also supplied in bond at special rates.

COLGATE & CO., 67, Holborn Viaduct, London, E.C.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 952.] SATURDAY, SEPTEMBER 22, 1888. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, October 3rd, at Eight o'clock.

The chair will be taken at half-past Eight *precisely*, by the President.

The Sessional Prizes and Certificates will be distributed at this Meeting.

An Address to the Students will be delivered by
Sir HENRY E. ROSCOE, M.P., LL.D., F.R.S.

All students and friends, ladies as well as gentlemen, are invited to be present.

SPECIAL NOTICE.

The Society's Libraries and Museums in London and Edinburgh will not be open in the evening during August and September.

PRELIMINARY EXAMINATION.

This Examination will be held throughout Great Britain, at 11 a.m., on the second Tuesday in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

Each Candidate must state at which of the following centres he desires to present himself :—

Aberdeen	Cheltenham	Inverness	Norwich
Birmingham	Darlington	Jersey	Nottingham
Brighton	Douglas, Isle of Man	Lancaster	Oxford
Bristol	Dundee	Leeds	Peterborough
Cambridge	Edinburgh	Lincoln	Sheffield
Canterbury	Exeter	Liverpool	Shrewsbury
Cardiff	Glasgow	London	Southampton
Carlisle	Guernsey	Manchester	Truro
Carmarthen	Hull	Newcastle	Worcester
Carnarvon		Northampton	York

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society, of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

There are at present *forty-nine* annuitants, receiving £1670 per annum, and casual relief is also granted, amounting in 1887 to nearly £500. The total expenditure in 1887 was £2375.

The following is the scale of pensions :—

£30 per annum to pensioners under 65 years of age, and

£35 per annum to pensioners 65 years of age, and upwards.

Donations and Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to RICHARD BREMRIDGE.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

The Forty-seventh Session will commence on Monday, October 1st, 1888.

CHEMISTRY

BY PROFESSOR WYNDHAM DUNSTAN.

The Lectures will begin on Monday, October 1st, at 9 a.m., and be continued on the first three days of each week.

PRACTICAL CHEMISTRY

BY PROFESSOR ATTFIELD.

The Laboratories will re-open on Monday, October 1st. Instruction in Practical Chemistry may be had daily throughout the Session, between 10 a.m. and 5 p.m. Entries may be made for various periods.

BOTANY

BY PROFESSOR GREEN.

The Lectures will begin on Friday, October 5th, at 9 a.m., and be continued on the last two days of each week.

MATERIA MEDICA.

Demonstrations will be given by Mr. E. M. Holmes, the Curator of the Museum, on Thursdays, at 10 a.m., commencing on October 4th.

PHARMACY AND PRACTICAL PHARMACY.

Lectures and Demonstrations will be given every week by Mr. Joseph Ince, on Tuesdays, Thursdays and Fridays, at 5 p.m., commencing on October 2nd. Laboratory work in Practical Pharmacy will be carried on from 3 to 6 p.m. on Mondays and Wednesdays.

A NEW PROSPECTUS OF THE SCHOOL IS NOW READY.

Application for Admission to the School, for Prospectuses, or for further information, may be made, personally or by post, to either of the above Teachers or to their Assistants, in the Lecture Theatre or Laboratories, 17, Bloomsbury Square, London, W.C.

THE PHARMACEUTICAL JOURNAL

Guaranteed Circulation of 7000 Copies Weekly.

(The LARGEST Issue of any Journal addressing Chemists and Druggists.)

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*** *In these Advertisements, Two Initials or Two Figures count as one word.*

Advertisers are requested to observe :—

1.—That Advertisements are received by the Publishers not later than Ten o'clock on Thursday morning, and they must be prepaid.

2.—That letters addressed to initials or to fictitious names at a Post Office are not delivered by the Post Office Authorities, but are at once sent back by them to the writers.

3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM. JOURN.**" and must be sent only to J. & A. CHURCHILL, 11, New Burlington Street, London, W.

Telegraphic Address, "Churchill, Publishers, London."

N.B.—The Journal is supplied from the publishing office post free to any part of the United Kingdom on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad (excepting India and China), 22*s.*; India and China, *viâ* Brindisi, 24*s.* per annum.

Payment may be made either by **Cash** in a Registered Letter, by **Postal Order**, by **Cheque** crossed London and County Bank, or by **Money Order**, payable at Regent Street, W., to J. & A. CHURCHILL. *Postage Stamps for any amount above Ninepence cannot be received in payment.*

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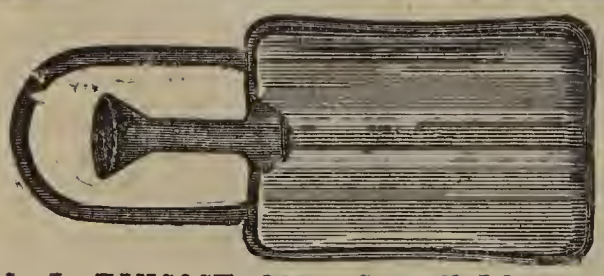

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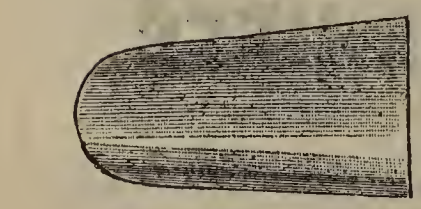

Fig. 5.

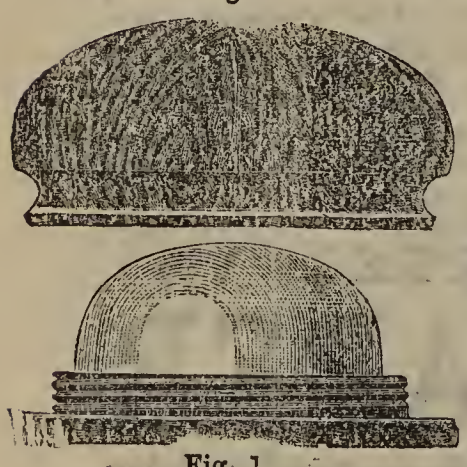

Fig. 1

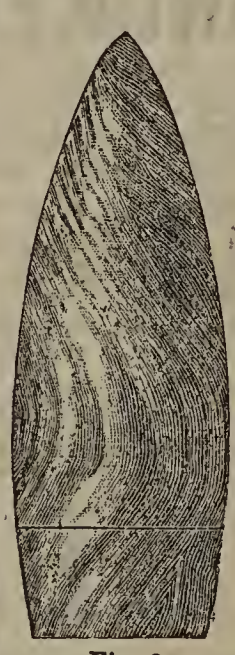

Fig. 3.

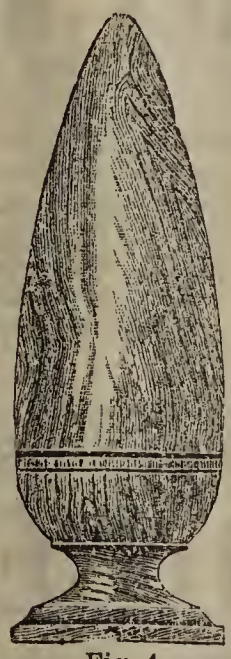

Fig. 4.

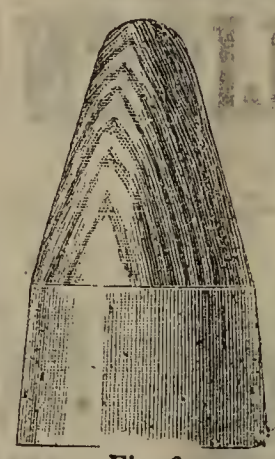

Fig 6.

Fig. 7.

Fig. 8.

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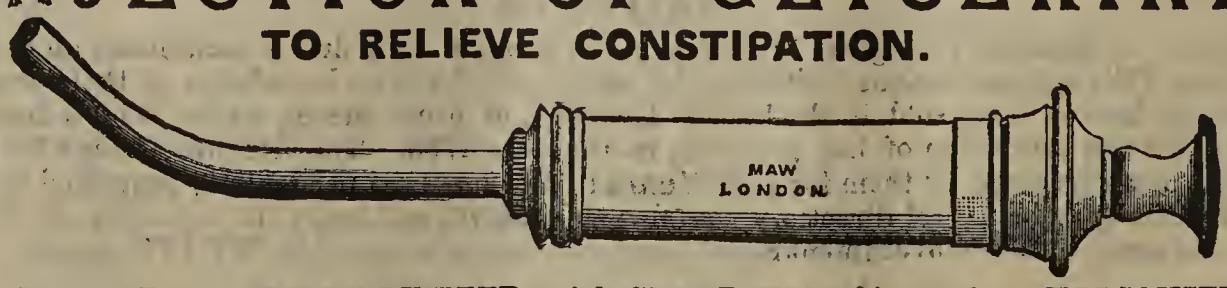

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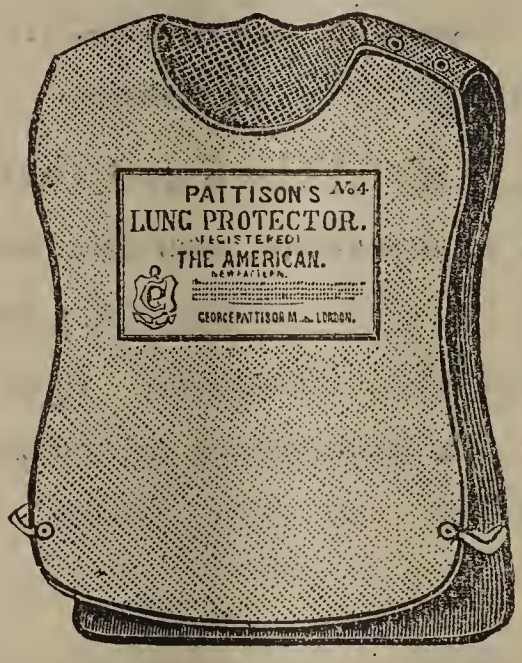

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SOME DRUGS OF BRITISH SIKKIM.

BY DAVID HOOPER.

The portion of the Himalayan mountain zone known as Sikkim in the Bengal Presidency has a rich and extensive flora. It embraces the plains called the Terai at the south of the hills and a gradual series of mountain ranges up to 10,000 feet above sea-level. The vegetation varies from the tropical cotton, banyan, figs and bamboo, through forests of sâl, toon, bombax, laurels, maple and oaks, to the region of magnolia and arboreous rhododendron. Among such a variety of plants it is not a matter of surprise to find many of them yielding products used in medicine, either by the natives themselves, or collected for purposes of trade. During a recent visit to the neighbourhood of Darjeeling a number of drugs were met with which are not commonly known in other parts of India, and the following notes from personal observation are arranged according to the "List of trees, shrubs, and large climbers found in the Darjeeling district, Bengal," by Mr. J. Sykes Gamble, M.A.

Menispermaceæ.

Tinospora cordifolia, Miers. (*Gurjo*, Paharia name).—A climber in waste places of the Terai. The wood of the stem and root is very soft, when dried it is ground up and used by the Paharias to cure cattle of pains in the stomach. Elephants are particularly fond of the succulent stems.

Bixineæ.

Gynocardia odorata, R. Br. (*Túk-kung*, Lepcha).—The tree is pretty common about the lower hill forests. The fruits are round, hard, and rough on the surface, and like the jack-fruit grow on the stems and main branches. The pulp is used by the Lepchas to poison fish; after boiling with water the pulp is eaten. The seeds which yield Chaulmugra oil are not collected here. The bark has lately been supplied to the Mauritius for use in fever. It is a thin bark breaking with a short fracture, pale brown externally, and red on the inner surface; it contains starch and tannin, and its infusion is characterized by the odour of essential oil of bitter almonds.

Ternstrœmiaceæ.

Schima Wallichii, Choisy.—A very large tree in the forests between 3000 and 6000 feet. The bark is nearly black externally with deep clefts; the liber is made up of an abundance of white, needle-shaped cells, which are readily detached and act as cowage in producing painful irritation when brought into contact with the skin. The tree is called *Chilauni* (or itching tree) by the Paharias on account of this property.

Dipterocarpeæ.

Shorea robusta, Gaertn. (*Sâl*, Hindustani).—The Sâl tree grows as a forest in the inner valleys of the Tista river, and is the most valuable timber tree in the district. It yields a quantity of resin, found in large pieces, often nearly 30–40 cubic inches in size, in the ground at the foot of the trees.

Sterculaceæ.

Pterospermum acerifolium, Willd. (*Hattipaila*, P.).—A very handsome tree with large flowers, and large leaves with white tomentose hair beneath. The soft tomentum is used by Paharias to stop bleeding in wounds.

Burseraceæ.

Canarium Bengalense, Roxb. (*Goguldhup*, P.).—A huge forest tree of the lower hills. A light yellow resinous exudation is found on the bark at nearly all seasons of the year. It is soft, tenacious, and has a slightly fragrant odour; the only use to which this resin appears to be put by the Lepchas is to burn it as an incense in their religious observances.

Rhamneæ.

Gouania leptostachya, D.C. (*Batwasi*, P.; *Tungcheongmonrik*, L.).—The leaves are used by Lepchas to make poultices for sores.

Leguminosæ.

Millettia pachycarpa, Bth. (*Kojulara*, P., *Brudung*, L.).—The roots of this large climber are used by the Lepchas for killing fish.

Entada scandens, Bth. (*Pangra*, P., *Takdokhyem*, L.).—The fruit is often 2 or more feet long, with large seeds. The Lepchas eat these seeds after long roasting and soaking to extract the poison. They are used by the Paharias to wash the hair.

Saxifragaceæ.

Dichroa febrifuga, Lour. (*Basak*, P., *Singnamook*, Bhutia., *Gebokanak*, L.).—A shrub of the upper hill forests from 4000 to 8000 feet. In many forests it forms the chief undergrowth. The yellow bark peels off in flakes. The root-bark, which is used as a febrifuge by the Paharias, is of a light colour, soft and corky in structure, and almost tasteless. It appears to have no active effects, unless it be taken in large quantity in the form of decoction. The natives take it in doses large enough to make them sick, and so indirectly to cure the fever. Loureiro, who discovered and named the plant, is the only one who notices its medicinal uses. The following is a translation of what he says:—"It is febrifuge, and cures quotidian, tertian and quartian fevers; if taken in the crude state it usually causes vomiting, but if slowly stewed in wine until the latter has evaporated, it purges the bowels and removes obstructions of the viscera. The natives use a decoction of the leaves, which acts more mildly if combined with liquorice; it is not a very safe remedy for old and weak people." The root-bark contains starch, but no tannin.

Combretaceæ.

Terminalia Chebula, Retz. (*Hana*, P., *Silim-kung*, L.).—The kernels of the fruit of this tree are eaten. The fruits are used as a medicine for sore-throat by the Paharias, who call it "Koki."

Myrtaceæ.

Eugenia obovata, Wall. (*Bara Jaman*, P., *Famsikol*, L.).—An evergreen tree growing on dry ridges in the lower hill forests. The bark ground up is said to be used by Paharias to stop headache; it is used like smelling salts or snuff.

Rubiaceæ.

Randia Dumetorum, Lam. (*Amuki*, P., *Maidal*, P., *Gundrow*, M.).—The fruit is about 1–1½ inches in diameter, the Mechis, or inhabitant of the Terai, use it to kill fish.

Pœderia fœtida, Willd. (*Padebiri*, P., *Takpœdrik*, L.).—A common small climbing shrub. Flowers red and fringed like the *Cinchonas*. The fruit is used to blacken the teeth by Lepchas and Paharias; this, they say, is a specific against toothache.

VACCINIACEÆ.

Pentapterygium serpens, Bth. (*Kall hurchu*, P., *Koombooten*, L.).—Small bulbous rooted shrub. It is used as a medicine to cure cattle of lameness, previously ground up and applied as a poultice.

LABIATÆ.

Teucrium Anacrostachyum, Wall. (*Gurupis*, P., *Chung-kung*, L.).—Very common in cleared places in upper hill forests. It has long upright spikes of yellow-white flowers, with long stamens, somewhat resembling a bottle brush when rather old. A quantity of sweet juice exudes from the flowers and this is sucked by Paharia herdsmen.

Colebrookia oppositifolia, Sm. (*Dosul*, P.).—A large shrub of the Sâl forests of the Tista and Rungit valleys. The down on the stem and leaves is used by Paharias to extract worms from bad sores on their legs.

POLYGONACEÆ.

Polygonum molle, Don. (*Totnye*, P.).—A large trailing shrub common over the hill near Darjeeling. The stems grow to 1 foot in girth; the shoots are eaten by Paharias and Lepchas and resemble rhubarb in flavour.

LAURACEÆ.

Cinnamomum Tamala, Nees (*Singoli*, P., *Nupsorg-Kung*, L.).—The aromatic bark is largely exported to Lower Bengal under the name of "taj." The leaves also are aromatic, and are collected, dried and sold in the bazaars by the name of "tespet." The bark and leaves of other species are aromatic, but are not so much used as the above.

EUPHORBIACEÆ.

Macaranga sp. (*Sing-Kung*, L.)—A tree of the middle hill forests, with leaves turning golden-red before falling in December. They are used by Lepchas to poison fish, and their juice is said to raise blisters if applied to the skin.

In the forests of British Sikkim are trees affording many useful gums, among them are the following:—*Bauhinia Vahlii*, *Albizzia procera*, *A. stipulata*, *Croton oblongifolius*, *Macaranga gummiflua*, *Ostodes paniculata*, *Garcinia stipulata*, *Bombax malabaricum*, *Stercula villosa*, *Garuga pinnata*, *Odina wodier*, *Spatholobus Roxburghii* and *Butea frondosa*.

THE PURITY OF COMMERCIAL SAMPLES OF DRIED SULPHATE OF IRON.

BY GEORGE LUNAN,
Pharmaceutical Chemist.

The Pharmacopœia of 1885 gives fuller details for the preparation of dried sulphate of iron than that of 1867, and a standard volumetric determination is added in the new volume. The presence of 97½ per cent. of $FeSO_4,H_2O$ is now necessary in the B.P. product.

Finding that this percentage was not common in commercial quantities coming into my hands, I made a collection of samples with the view of determining if this deterioration was common.

The variety in colour of the different samples was so remarkable that I thought it would be interesting to tabulate this peculiarity, along with the percentage of $FeSO_4,H_2O$. The latter was determined by the pharmacopœial method, the standard solution of potassium bichromate being, however, attenuated so as to get more exact results. In each case the experiments were repeated five or six times and the mean of the whole taken.

I have also tabulated the solubilities in water of the various samples; an estimation not of definite value, but one which with considerable practice proved a rough and ready method from which much was learned.

Subjoined are the results of the examination of nineteen commercial samples collected from a large radius.

The average percentage of $FeSO_4, H_2O$ of the nineteen samples is 88·98, or practically 89, which is 8·5 less than required by the B.P.

Only two samples were over the pharmacopœial standard.

That the most highly coloured ones were the

Sample.	Percentage of $FeSO_4,H_2O$.	Colour.	Solubility in distilled water.
A . .	75·225	Nearly white; greenish tint.	Entirely and quickly; powder separated by rate of solubility from a few green crystals.
B . .	93·075	Dark greyish white.	Large insoluble deposit; dark yellow solution.
C . .	86·7	Dull greyish white.	Considerable insoluble deposit; yellow solution.
D . .	89·25	Greyish white.	Almost entirely dissolved; solution opaque and tinted.
E . .	80·58	Degree less white than A.	Entirely and quickly; although retarded by a few effloresced crystals.
F . .	97·665	Nearly white, shade less so than A and E.	Uniformly and entirely, although slowly dissolved.
G . .	90·78	Greyish white.	Not entirely dissolved; yellow solution.
H . .	83·25	Greyish white.	Almost entirely; tinted solution.
I . .	98·43	Almost white.	Entirely although slowly; faintly tinted solution.
J . .	95·37	Dull greyish white.	Nearly dissolved; opaque and tinted solution.
K . .	89·8	Almost white.	Small quantity yellow deposit, but supernatant solution bright.
L . .	90·78	Dark greyish; green tint.	Part rapidly, remainder slowly and almost entirely, to bright solution.
M . .	96·5	White, with dull grey tint.	Slowly but entirely.
N . .	84·15	Greyish white.	Almost entirely.
O . .	92·85	Dull greyish white.	Small quantity, yellow deposit.
P . .	94·35	Dark greyish white.	Tinted solution; yellowish brown deposit.
Q . .	92·8	Dark greyish white; darker shade than P.	Tinted dark solution, but almost entirely.
R . .	80·825	Nearly white.	Quickly and almost entirely.
S . .	78·288	Dark grey.	Large insoluble brown deposit.

worst, as far as solubility, will be easily understood, but that the best and the worst presented nearly the same physical properties is not so easily explained.

On the whole it could not be urged by anyone that these results are satisfactory to pharmacists.

Perhaps to very many the amount of dried sulphate of iron dispensed would not justify very extensive testing or estimating, but the fact that such a considerable proportion of inferior quality is on the market ought to place everyone who has a respect for his business reputation on his guard.

It was mentioned that with some practice the solubility would be a very fair guide of the value, and from the above table it will be seen that wherever a nearly white sample showed a slow, but entire solubility, the estimation was high. This can be generally depended on, as dark samples, though invariably having, when estimated, a fair comparative value, never reached the standard required.

Among the samples are two supplied by a representative English firm as "pure" and "commercial," and offered at prices which bear the proportion of $2\frac{1}{4}$ to 1, and yet the difference in percentage of $FeSO_4,H_2O$ was little over two in favour of the "pure."

A sample supplied by a retail pharmacist, who sent it with the declaration that he preferred always to dry his own, only contained 84·15 per cent., and one from another firm who made the same statement, only contained 86·7 per cent.; so that to recommend pharmacists to dry the preparation themselves is evidently not the panacea.

Again it has been said that the wholesale houses have a demand for an entirely ferrous dried salt, and that as a consequence they do not overdo the drying process on this account.

Surely, however, when it is shown, as with samples F and I, and almost by M, that an unoxidized and nearly dried product can be obtained, this objection will cease to be urged.

A, E and R are probably the result of the demand for a white readily soluble salt, but their percentages place them so much beneath the range of the B.P. as to make them inadmissible in dispensing.

These seem to correspond more nearly to the requirements of the German Pharmacopœia, deprived as they are of only a portion of their water of crystallization, bearing no similarity to the percentage required by $FeSO_4 \cdot 7H_2O$.

Sample L presented such a unique appearance physically as to look as if it were merely powdered commercial sulphate of iron of a very dark colour; but, although very damp, it belied its appearance and estimated up to 90 per cent.

Looked at closely through the microscope many of the samples showed the unevenness of their drying, being divisible into three portions: first, small grains of effloresced $FeSO_4 \cdot 7H_2O$; second, uniformly dried powder; and third, dark coloured powder. It was concluded that the first part had been at the top, the second in the middle and the third at the bottom of the drying vessel, and that if the substance had been more evenly stirred there would have been neither "overdone" nor "underdone" in the product.

35, *George Street, Edinburgh.*

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 22, 1888.

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THE TEACHING OF CHEMISTRY IN SCHOOLS.

ONE of the principal events in the chemical section of the British Association during its recent meeting at Bath was the presentation of a report on the teaching of chemistry in schools. The subject is one of great interest and importance, and, moreover, one which has, for the last ten years, demanded attention at the hands of men of science. It has long been apparent that—although chemistry is said to form part of the curriculum of many schools—the ordinary boy profits little or nothing by the instruction which it is alleged he has received. The large majority of those boys who subsequently come to the University or the local College have only a mere smattering of the subject, and wholly lack that accurate, though elementary, knowledge of the leading facts of the science which the Professor at such an institution ought to be able to assume. The result is that a young man is obliged to be instructed in the groundwork of the science, at a time when he ought to be engaged in the study of its higher branches. A large part of the time of the Professor or Lecturer at the school of medicine or pharmacy, and even at the University itself, is taken up in teaching elementary chemistry, work which ought to have been performed by the schoolmaster.

If we seek to inquire into the cause of this defect in our educational system, we find ourselves on the threshold of a very large subject. It is hardly necessary, nowadays, to insist on the importance of teaching science to boys—and girls, as Miss LYDIA BECKER took occasion to add during the discussion at Bath. Few could now be found to deny the claims of science to a footing equal at least to that of Greek or Latin grammar, while none would deny the assertion that without previous sound instruction in the elements of physical science no effective teaching of medicine, of pharmacy, of engineering, of agriculture, or, in a phrase, no "technical education" is possible. Yet, in spite of this public enlightenment, science, and chemistry in particular, is not a popular—one might perhaps even say not a profitable—subject, in our public schools. Such considerations cause the matter to assume a national importance, and it was therefore fitting that the British Association for

the Advancement of Science should appoint a representative committee to enquire into and report upon the present methods of teaching chemistry. This Committee, which was appointed at Manchester last year, consisted of Professor Armstrong (City and Guilds Technical Institution), Mr. J. T. Dunn (Gateshead School), Professor Dunstan (Pharmaceutical Society), Dr. Gladstone (London School Board), Mr. Vernon Harcourt (Christ Church, Oxford), Mr. Francis Jones (Manchester Grammar School), Professor McLeod (Cooper's Hill Engineering College), Professor Meldola (Finsbury Technical College), Mr. Pattison Muir (Caius College, Cambridge), Dr. W. J. Russell (St. Bartholomew's Hospital), Professor Smithells (Yorkshire College, Leeds), Mr. W. A. Shenstone (Clifton College), and Mr. Stallard (Rugby School). In the report which was read at Bath, Professor Dunstan, who has acted as Secretary to the Committee, gives an account of the work which has been done during the past year. Although the Committee was appointed to make a general inquiry into the teaching of chemistry, it was found necessary to restrict its work, at first, to the teaching of chemistry in schools. In a letter which was addressed to the Head Masters of five hundred public schools in Great Britain, which were stated to teach chemistry, the Committee asked for a report on the teaching, and, in particular, for information on the following points. 1. The objects with which chemistry should be taught in schools. 2. The difficulties that are met with in teaching, and the best way of obviating them; the influence exerted by external examiners on the character of the teaching. 3. The methods which are most likely to render the teaching effective as a mental discipline, and as a preparation for subsequent instruction in the higher branches of the science or in applied chemistry.

It is a significant fact that only eighty-six schools replied to the letter, but it should be added that these included the principal public schools in the country. These replies represent a total number of 23,350 pupils, of whom 8,418 are taught chemistry, that is 36 per cent. It is to be feared that this percentage, low as it may seem, cannot be taken to represent the average state of affairs, since it is well known that in many of the schools from which replies have not been received the percentage is very considerably lower than this. It is impossible on the present occasion to reproduce, or even to refer to, the many interesting statements which occur in this report. The following paragraph is taken from one of the replies to the first question suggested by the Committee :—

"All my experience shows that even to young children chemistry may be made the threshold of the fairyland of science, and that by means of it they may early acquire a profound sense of the rigorous, unyielding nature of law and of the unity in the midst of diversity which pervades the world around us. Again, as a mere discipline for the intellect, I believe chemistry is destined to take the place of Latin and Greek grammar, when a definite course of teaching has been laid down, and teachers have themselves mastered that course as thoroughly as former teachers had mastered their accidence and syntax. To make the pupil aware of the existence of an unknown, unexplained, inscrutable side to every, and even the simplest phenomenon, is to awaken desire, expectation, pleasure—all the antecedents of healthy mental effort, and the difference between the daily, hourly life of one who has thus become conscious of the literally infinite, ineffable nature of things around him, and that of one who thinks he knows all about them, is immense."

An objection to the teaching of science which is frequently urged from the classical side is well met in the following criticism :—

"Too much weight may easily be attached to the objection often urged against chemical teaching (and, indeed, against the study of other branches of natural science), that it fails to cultivate good taste and good style; that the learner is brought into contact merely with material facts and not with human thoughts, and so acquires a character and mode of expressing himself as hard, rough, and unsympathising as the laws of nature with which he deals. It is certainly impossible to avoid noticing that the abstracts of lectures and answers to examination papers shown up by those who have been, or are being, well trained in 'the humanities' are composed in much better style than the productions of boys who have had less advantages of the kind, or who, from their dulness in other subjects, are considered to be exactly fitted for learning natural science. But the power of refuting this objection rests with the teacher. If he refuses to pass over bad spelling and bad grammar, if he takes the trouble not merely to point out slovenliness of expression, but to show how it may be corrected, and if the learner is compelled to rewrite any careless, inaccurate work in better form, there seems no reason why an account of the two oxides of carbon, including an intelligent comparison of their properties, may not be made as good an exercise in English composition as an essay on points of Greek and Roman history."

Numerous difficulties are alluded to by various teachers as standing in the way of efficient teaching. It is quite obvious that no proper teaching in chemistry can be given without a decently-equipped laboratory. Yet it appears that sometimes a teacher is expected to get on with no laboratory at all, and at other times he is hampered by having to teach many boys in a small laboratory. It is nothing short of a disgrace that the science master of one of our largest public schools should have to report that "the chief obstacle to the effective teaching of chemistry here is the poorness of the laboratory—a room in the basement, low pitched, ill lighted and worse ventilated, accommodating only fifteen boys, and in such connection with the other class-rooms as to make some of them almost unbearable when experiments are made with any foul-smelling gas."

It appears that the time usually devoted to chemistry is small out of all proportion, as compared with the time which is given to other subjects. "The difficulty is to make all pupils take a real interest in the work. In the short

time which is allowed to the subject it is apt to become a mere collection of facts in the boy's mind. It is a curious fact that a double labour is expected from the teacher of science, namely, a general development and quickening of the reasoning faculties, and the teaching of examination chemistry at the same time; and all this has to be done in two hours a week! Parents, at any rate, tacitly pay a very high compliment to the resources of science when they expect this. As a matter of fact, the unfortunate science master very naturally leaves the great work of development to the master who monopolises the remaining twenty-six hours of the week's work." In his "spare time" this same unfortunate "science master" is probably expected to teach other subjects than his own; he is not infrequently asked to take classes in mathematics, history or classics. It would be no less absurd to insist that the mathematical master should teach classics or that the classical master should teach science. Another serious complaint is to the effect that the best boys in a school are never taught science at all, and that the science classes are largely recruited from boys who have failed in other subjects. In nearly every instance it seems that the position of a boy in the school is determined by his classical proficiency and without reference to his progress in science. The result of this may be stated in the teacher's own words: "The boys are sent to chemistry lectures grouped according to classics; the result is confusion. Take the fifth form for example. It is sent into the laboratory for an hour's lecture. In that form you have some of your promising boys, also some of the weak ones, very good classics possibly, whom to teach chemistry is, you know, hopeless. But the work must be done, so you take a medium course, pitching your discourse to suit the average boy; you must be very careful to aim low or you will certainly hit nothing. In so doing your lecture is below the promising boys, who feel a growing contempt for you or your subject, and at the same time the lowest boys are wearied by matter which they cannot grasp."

All the evidence which has been collected by the Committee goes to show that the root of the evil lies in the apathy of the governing bodies or head masters of public schools. In spite of the general interest which the public takes in the teaching of science, it seems that head masters have not yet realized that to render the teaching effective and to make the subject as valuable as other school studies, it must receive the same amount of attention, must be put on the same footing, and must be dealt with on the same lines as other subjects. Classical bias has no doubt much to do with this ill-treatment of science. The time ought long since to have arrived when the whole school, every boy without exception, shall receive scientific instruction of a general and elementary character.

On another occasion we propose to refer to some other aspects of chemical teaching which are alluded to in this report.

The sudden death of Dr. Peter Griess, at Bournemouth, on the 30th ult., has removed a chemist who has left his mark in the history of organic chemistry. It was whilst working in the laboratory at Marburg, under the superintendence of Professor Kolbe, that he made his discovery of the diazo compounds. He afterwards became an assistant to Professor Hofmann in this country, but eventually undertook the supervision of the laboratory of Allsopp's Brewery, Burton-on-Trent.

* * *

The seventeenth annual meeting of the Deutsche Apotheker-Verein was held in Berlin on the 11th and 12th of the present month, and was well attended, about three hundred members signing the entrance book. The report presented was a favourable one, and showed that the membership had increased from 2842 to 2986, the highest point it has yet attained. Amongst the resolutions passed was one to increase from 150 to 300 marks, the amount granted by the Association to a certain number of deserving pharmaceutical students to assist them in obtaining necessary education. The number of grants to be made annually is sixteen, and it is curious to note that the number of applications has fallen off from 55 in 1882 to 29 in 1888. The next annual meeting of the Association is to be held in Würzburg.

* * *

We learn from the *Druggists' Circular* that at the last meeting of the American Medical Association a proposal for an amendment to the constitution of that body was presented, providing for the formation of a section on pharmacy, and materia medica. The amendment would provide that the section should be organised in the same manner as a recently established dental section, and that pharmacists might be sent to it as delegates by the various State pharmaceutical associations. Under the rules the amendment will stand over for consideration at the next annual meeting.

* * *

A prospectus has been issued of classes in connection with the North of England Pharmaceutical Association, adapted to the requirements of pharmaceutical students, that will be held at the Durham College of Science, Newcastle, during the coming session. They include three courses of twenty lectures each on Chemistry, namely, an elementary and an advanced course on Inorganic Chemistry, delivered by Mr. Saville Shaw, on Tuesday and Wednesday evenings, the former commencing on October 16th, and the latter on January 16th; and a course on the Chemistry of the Carbon Compounds, by Professor Bedson, D.Sc., delivered on Monday evenings, commencing on October 15th. The Chemical Laboratory will also be open on Tuesday and Wednesday evenings for practical work. Conditional upon the entry of ten students, there will be a Materia Medica class, conducted by Mr. Alfred Wright, on Wednesday evenings, from October 17th to the end of March, and a Botany class, conducted by Mr. C. E. Stuart, on Friday evenings, from October 19th to the end of March. The Pharmacy class will be conducted by Mr. B. S. Proctor, and will meet on Monday evenings, from October 15th to December. In addition, the ordinary lectures and laboratory work will be open to students in pharmacy on payment of the usual fees, and attention is especially called to a course of lectures on Physics. Copies of the prospectus may be obtained of the Hon. Secretary, Mr. C. B. Ford, 17, Great Market Street, Newcastle, or of the Hon. Curator, Mr. A. Wright, 29, Mosley Street.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, September 5.

Present—The President, Mr. James E. Brunker, M.A., in the chair; Mr. Draper (Vice-President), Messrs. Hodgson, Wells, Dr. Montgomery, Dr. Collins, Charles Evans, Grindley, Allen and Dr. Tichborne.

Correspondence.

The following letters were read:—From Mr. John Evans, thanking the Council for having re-elected him Examiner in Pharmacy; from the Curator of the Technological Museum of New South Wales, acknowledging receipt of a copy of the Society's Calendar for 1888; from Mr. John Gilbert, of 120, Patrick Street, Cork, asking that his son, who would not be sixteen years of age until October 4, might be permitted to appear at the examination on October 1.

On the motion of the Vice-President, seconded by Dr. Collins, it was resolved to permit Mr. Gilbert, junior, to appear at the Preliminary examination, as he would only three days later arrive at the qualifying age.

Examination Papers.

Dr. Montgomery suggested that in future copies of the examination papers should be laid on the table at the first meeting of the Council after each examination.

Dr. Tichborne: Would they not come better along with the reports of the examiners which are presented at the meetings following the examinations?

Pharmacy Act (Ireland) Amendment Bill.

The President said he had a few words to offer as to the present position of the Pharmacy Act Amendment Bill. When they met last month they were not aware of the fact that the Bill had been actually put down for second reading in the House of Commons. It had since been read a second time, and was down for committee stage on August 9. He had held himself in readiness to go over for committee, at Messrs. Clay and Close's request, but it was thought advisable by their agents to postpone the committee stage until the adjourned session. That stage was now fixed for November 14, when he hoped the Bill would substantially get through. They were quite prepared to accede to any reasonable suggestions as to amendments that would not be inconsistent with the principles or efficiency of the Bill.

On the motion of Mr. Allen, seconded by Mr. Wells, a report of the Law Committee was adopted.

On the motion of Mr. Wells, seconded by Mr. Grindley, the certificates for the candidates for the licence who had passed the examinations were ordered to be sealed.

New members of the Society having been elected the Council adjourned.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

Annual General Meeting.

The annual general meeting was held on Wednesday, September 12, when the President, Mr. W. H. Maxey, occupied the chair. The usual preliminary business having been transacted, the President proposed that two scrutineers be appointed to count the votes sent in for the election of members of council for the ensuing year.

This being agreed to, the Secretary next proceeded to read the report of the retiring council. In this the members of the Society were congratulated upon the unprecedented success that had attended the year's work. They were reminded that the claims of the Society to be recognised as a living factor in the world of pharmacy had been fully admitted and its efforts in promoting the truest interests of the profession acknowledged. The various essays read and lectures delivered had proved of more than usual interest and had all been found suitable for publication *in extenso* in the pages of the *Pharmaceutical Journal*, whilst one had been further re-issued to the members in pamphlet form. The "Students' Nights" had been a great success, and the interest of the associates in the proceedings of the Society aroused thereby. As regarded the financial position, it must be noted in inspecting the figures that they covered the expenses practically of eighteen months, owing to the alteration in the time or commencement of the financial year. The main charge upon the Society's funds had been the school of pharmacy, which had been installed in new and more suitable premises at considerable expense, though this burden had been lightened by the munificent grant of £50 from the Council of the Pharmaceutical Society of Great Britain. The school itself had been more successful than ever. The entries had been more numerous than before and the students had done real honest work. Altogether a very high position had been taken in the work of provincial pharmaceutical education. The Society had lost, by death, during the year one member, Mr. Dufty, and one associate, Mr. Harold Cole. The latter was the Society's librarian and a young pharmacist of great promise, and there was especial reason to regret his untimely death.

Election of Council.

After the report had been fully discussed and agreed to, the President announced the result of the counting of votes.

Fifty-six voting papers had been sent out and twenty-five were returned.

The numbers stood as follows:—G. T. W. Newsholme, 24; G. A. Grierson, 21; W. H. Maxey, 21; C. O. Morrison, 19; J. H. Bradwall, 17; Geo. Ellinor, 17; John Humphrey, 15; Wm. Ward, 15; S. S. Rhoden, 14; E. R. Learoyd, 13; A. R. Fox, 11; J. Preston, 11.

These gentlemen therefore form the New Council.

Votes of thanks were accorded to the retiring Council and the lecturers for their services, also to the donors whose gifts had been reported from time to time, after which the meeting concluded.

Meeting of the New Council.

The first meeting of the New Council was held on Friday, September 14, to elect officers for the year. Mr. E. R. Learoyd was chosen President; Messrs. Fox and Ellinor, Vice-Presidents; Mr. G. T. W. Newsholme, Treasurer; Mr. C. O. Morrison, Secretary; Mr. C. D. Moffat, Librarian; Messrs. Cubley and Watson, Auditors; Messrs. Grierson, Humphrey, Rhoden, and Worrall as lecturers.

The question of a class in practical pharmacy was discussed, and it was decided to hold a course of lectures on that subject. It was also intimated that attendance at the various classes would meet the requirements of the Examining Board in England of the Royal Colleges of Physicians and Surgeons. Hence the attention of medical students might with advantage be drawn to the syllabus of the school.

The Council adjourned at a late hour.

British Pharmaceutical Conference.

TWENTY-FIFTH ANNUAL MEETING.
FIRST DAY'S PROCEEDINGS.

Tuesday, September 4.

(*Continued from page* 216.)

On resuming the first paper read was on—

The Chemistry and Pharmacology of some of the Morphine Derivatives.

BY D. B. DOTT, F.R.S.E., AND RALPH STOCKMAN, M.D.

We have continued our investigation of the morphine derivatives, but have not gone over the ground so completely as anticipated, on account of our time being so much occupied with other work.

Since the period of our last communication we have devoted further attention to the very interesting alkaloid which has been variously described as dimethylmorphine, methocodeine, and methylmorphimethin. Whatever may be the exact constitution of this body, we are clear that it is not correctly described as dimethylmorphine. The fact seems to be well established, that while the morphine molecule contains two hydroxyls, only one of these is capable of having its hydrogen replaced by an alcohol radical; although both hydrogens are readily replaced by acid radicals. As the analysis of the hydrochloride and chloroplatinate described in our former paper showed that they retained water when dried at any temperature under that of decomposition, it occurred to us that the composition of the substance in question may really be that of two molecules of dimethylmorphine with the elements of water, accompanied by a corresponding rearrangement of the molecule. This point we have not yet determined, chiefly on account of unexpected difficulties met with in the preparation of the substance. In several experiments, in which methylated spirit was used to dissolve the morphinate of soda and methyl iodide, either no methocodeine was formed or only an infinitesimal quantity, methylmorphine being almost the sole product in each case. It was not for some time suspected that the solvent was at fault, but on trying wood spirit instead of methylated, a fair yield of methocodeine was obtained. This is an interesting result, whether it is due to the methyl of the wood spirit taking part in the reaction or to some more obscure influence. Apart from chemical considerations, the physiological action of methocodeine is so essentially distinct from that of codeine as almost to be sufficient proof in itself that the former cannot be regarded as dimethylmorphine. For, while diacetylmorphine retained essentially the characteristic effects of morphine on the animal organism, it was found that the so-called dimethylmorphine, instead of affecting the central nervous system, acted as a poison to the muscular system (*vide* 'Trans. Brit. Pharm. Conf.,' 1887).

Acetylmorphine, when prepared by acting on morphine with large excess of glacial acetic acid, is liable to contain a certain amount of diacetylmorphine. The muriate of the former is much less soluble than the muriate of the latter, by which means a method is afforded for their separation. Yet even after such purification the monoacetylmorphine chloroplatinate gave 18·21 per cent. of Pt, theory requiring 18·48 per cent. A better method is to allow anhydrous morphine and acetic anhydride in equivalent proportions to react at about 100° for an hour. The mass is then treated with water and slight excess of sodium carbonate, and shaken up with ether, which on evaporation leaves the acetylmorphine. The chloroplatinate prepared from the residue gave 18·54 per cent. Pt.

Diacetylmorphine was prepared by the action of acetic anhydride on anhydrous morphine in the proportion of 25 grams of the former to 30 of the latter. When a smaller amount of acetic anhydride was used the product was found to be mixed with the monoacetyl derivative. The mixture was heated for several hours at the temperature of a water-bath, then diluted ammonia added, and the whole shaken up with ether. On evaporating the ether, diacetylmorphine remained. Its chloroplatinate gave as a mean result 17·15 per cent. of Pt. The percentage required by diacetylmorphine chloroplatinate is 17·13. The base is soluble in alcohol, ether, and chloroform, and readily crystallizes on spontaneous evaporation of the solutions.

An account of the physiological action of the monoacetyl derivative was laid before the Conference last year. Diacetylmorphine has a similar action, but of more pronounced character.

Benzoylmorphine has been prepared before by others, but not by the same method which we adopted. While morphinate of soda readily reacts with an alkyl chloride to form a substitution compound, it was not certain that the reaction would proceed similarly with the chloride of an acid radical. We might either have—

$$C_{17}H_{19}NO_3, NaHO + C_7H_5OCl = C_{17}H_{19}NO_3, C_7H_6O_2 + NaCl$$

or

$$C_{17}H_{19}NO_3, NaHO + C_7H_5OCl = C_{17}H_{18}(C_7H_5O)NO_3 + NaCl + H_2O.$$

Accordingly 30 grams of morphine were dissolved in alcohol with 4 grams caustic soda, and 14 grams benzoyl chloride added. The mixture was allowed to stand in the cold for 12 hours, then heated to boiling, and evaporated. It was now rendered distinctly alkaline and shaken up with chloroform, was next filtered, the chloroform separated and evaporated. A crystalline residue was left, which was purified by recrystallization from hot spirit. The chloroplatinate dried at 130° gave 16·22 per cent. of Pt, the theoretical yield being 16·48. This slight discrepancy must be due either to the platinum compound not being anhydrous at 130° or to a small amount of decomposition during the purification. There is no doubt that the substance was to all intents and purposes pure benzoylmorphine. The reaction, therefore, proceeds according to the second of the above equations. The hydrochloride was prepared, but could not, by any means, be obtained in the crystalline state.

The dibenzoyl derivative could not be prepared by the same method, doubtless because it is only the H of the phenolic hydroxyl which is replaceable by sodium, and therefore double decomposition can only take place to that extent. Dibenzoylmorphine was actually prepared, by heating together in a sealed tube 10 grams morphine with 20 grams benzoyl chloride, at a temperature of about 100° for six hours. The contents of the tube were then dissolved in water, ammonia added, and the whole agitated with chloroform, which dissolved practically everything. On evaporating the solution, no crystals formed in the residue, even after several days. When dissolved in ether the residue was likewise non-crystalline. It was then found that a certain amount of free benzoic acid was present. Wherefore the substance was dissolved in water, excess of ammonia added, and the precipitate collected and washed. It was next dissolved in boiling alcohol and the solution left to evaporate gradually, when crystals very slowly formed. The chloroplatinate gave 13·86 per cent. Pt, thereby requiring 14·03 per cent. The dibenzoyl compound is indeed an unsatisfactory thing to work with, being prone to decomposition, especially when converted into a salt.

As regards the physiological action of benzoylmorphine, it is unnecessary to go into details, as a few experiments were sufficient to show that both in general action and in dosage it so closely resembles acetylmorphine as to be practically identical with it.

With dibenzoylmorphine great difficulty was experienced in determining the exact action, owing to its great insolubility in water. We therefore reserve an account of it for some future occasion.

Amylmorphine was formed in the same manner as the methyl and ethyl derivatives, by allowing morphinate of soda and amyl chloride to react together in alcoholic solution, with subsequent evaporation and extraction with chloroform. The yield was very small. On converting into muriate the salt readily crystallized. The platinochloride gave 17·68 per cent. of Pt, amylmorphine platinochloride giving by calculation 17·48 per cent. It appears to have the same physiological action as ethylmorphine.

"Morphine-sulphuric-acid-ether" is the name which has been given in English to Stolnikow's "*morphinätherschwefelsäure.*" It should perhaps rather be called "morphinyl-sulphuric acid" if its constitution is as represented, viz., $C_{17}H_{18}NO_2.SO_4H$. The compound is prepared by the action of morphinate of soda on potassium pyrosulphate. We exactly followed Stolnikow's instructions,* but obtained so small a yield that we were at first disposed to regard the body as somewhat mythical. A small amount of a compound is, however, obtained which is sparingly soluble in water, does not give the morphine colour reactions, and which yields sulphate of barium on treatment with hydrochloric acid and barium chloride. Whatever may be its exact constitution, there is no doubt that it is the *morphinätherschwefelsäure* of Stolnikow.

As it is so insoluble in water, the experiments on animals require to be made with a watery solution to which a few drops of liquor sodæ have been added. This, however, does not affect the general results. From our own observations we cannot confirm Stolnikow's statement that the action of morphine depends greatly on the presence of one of the hydroxyl groups, and that when this is replaced by a physiologically neutral body, such as the sulphuric acid radical, the resulting effect is to greatly diminish the activity of the morphine. The narcotic power of the new body is certainly much inferior to that of morphine, just as the narcotic power of codeine is, and generally speaking its action closely resembles that of codeine in other respects. In the case of morphine the substituting body therefore seems to be of minor importance, the alteration in action apparently depending rather on the particular portion of the morphine molecule which becomes substituted.

Chlorocodide.—We first tried to prepare this compound by the action of strong hydrochloric acid on codeine, after the manner described by Wright.† The product however was evidently a mixture, as was manifest both by analysis and by the physiological action of the various fractions. We then tried the method of Gerichten. 13·5 grams of codeine hydrate were dried at 120° and mixed with 10 grams pentachloride of phosphorus; 50 grams of oxychloride of phosphorus were then poured over the mixture, whereon a violent action ensued. After some hours, the clear solution was diluted, ammonia added, and the precipitate received in a filter. The precipitate was washed, pressed, and dried by exposure to the air; then dissolved in chloroform, which was left to evaporate. On adding alcohol to the residue, it became filled with crystals, which were purified by pressure and recrystallization. The chloroplatinate after drying in exsiccator for five days gave 18·77 per cent., $Pt\,(C_{18}H_{20}NO_2Cl)_2\,Pt\,H_2Cl_6$ = 18·73 per cent.

The chlorocodide prepared by Wright's method contained always so large a proportion of apocodeine as to quite obscure its own physiological action.

The other specimens made in the manner described by Gerichten contained no impurities which caused emesis, and had to a very large extent the same action as morphine itself.

Morphine was treated with phosphorus pentachloride and oxychloride in the same way as the codeine, and evidently with the same general result, that of substituting chlorine atoms for hydroxyl atoms, but apparently also replacing one or more hydrogen atoms by chlorine. From the results of several experiments, it is clear that more than one chlorinated derivative is formed. They are unfortunately either amorphous or difficultly crystallizable, and therefore not easily separated or purified. The crystallized portion obtained by treatment with chloroform and alcohol yielded a chloroplatinate, which on incineration left 17·45 per cent. of $Pt\,(C_{17}H_{16}Cl_3NO)_2$, $Pt\,H_2Cl_6$ = 17·43 per cent. of Pt. Although it would be impossible without a combustion analysis to state positively that the compound has the formula indicated, there is every reason to believe that it is so. The compound may therefore be called provisionally "trichloromorphide." Of the more highly chlorinated bodies we cannot at present say anything, as our results are not sufficiently complete. These compounds are of great interest and well worthy of being investigated.

Only a few preliminary experiments have as yet been made to investigate the physiological action of these substances.

The PRESIDENT, in moving a vote of thanks to the authors of this paper, remarked on its being the joint production of a pharmacist and a medical man, and suggested that members might more frequently with great advantage obtain the assistance of members of the medical profession in such investigations.

Dr. THRESH said it was a very difficult matter for any one unacquainted with medicine to realize the importance of investigations of this character. Though apparently dry and uninteresting when read, their importance could scarcely be overestimated. It was only by the joint efforts of chemists, physiologists, and the clinical experience of the physician, that they could ever hope to obtain a scientific foundation for the treatment of disease by medicine. At present it was almost entirely empirical, but the scientific foundation was now being laid by numerous investigators, and they might be proud that the Pharmaceutical Conference was producing men capable of associating with physiologists and physicians, and of helping them to bring about this consummation which was so devoutly to be wished.

Mr. SIDNEY PLOWMAN said he could not allow this paper to pass without a word or two. It was quite beyond criticism, for it was full of practical experiments, and the Conference accepted without hesitation results obtained by such workers. He endorsed what had been said by Dr. Thresh, that this was the direction in which members of the Conference might work. At present, as the authors said very modestly, only a few physiological experiments had been carried out, but one could not tell what might be the result of the formation of various alkaloidal and other derivatives, and what their physiological effect might be. It was perhaps superfluous to point out the tremendous difference between the action of morphine and apomorphine, which was produced simply by the abstraction of the elements of one molecule of water. Although the investigation of questions of this kind was of absolutely prime importance in the treatment of disease, he could not agree with Dr. Thresh that medical treatment at present was solely empirical, for there were many advances towards scientific therapeutics; but it was no doubt mainly so, and it was only by investigations of this kind and by careful physiological experiments with definite substances that they could hope for an approach to scientific therapeutics, the branch of medicine which was most backward of all.

* *Zeits. f. phys. Chemie*, viii., 252.

† 'Proc. Roy. Soc.,' xviii., 83.

Mr. DOTT said besides these experiments on morphine and codeine the authors had carried out a number of experiments on the derivatives of narcotine and other alkaloids, but they were not in all cases sufficiently satisfied of the purity of the substances employed to publish the results. A most important point to be noted was that contrary to the generally received opinion there was not that marked difference between the physiological action of the various opium alkaloids which had been supposed; it was rather a difference in degree than in kind. They all had a narcotic action, and perhaps a tetanising action, which might in some cases be more pronounced than in others. In fact, they resembled each other very much as the cinchona alkaloids did.

The PRESIDENT said he was sure the Conference would agree with him in expressing a hope that Mr. Dott and Dr. Stockman would continue this important investigation.

A paper was then read entitled—

EXTRACTION BY PRESSURE.

BY CHARLES SYMES, PH.D.

In these days of percolation and repercolation it may seem somewhat antiquated, or as our American friends would say, an attempt at resurrecting, to appear as an advocate of extraction by pressure. Certain is it, however, that our earliest acquaintance with the nature and properties of drugs was obtained by the administration of either the infusion or decoction, the crude material in powder, or the essence, extract or juice obtained by pressure.

That chemistry and the more exact methods in practical pharmacy have done much to enable us to separate the active constituents and proximate principles of plants in convenient forms, and that rude and uncertain methods have been rendered more refined and exact, no one will, I think, deny. But there are members of the medical profession who doubtless with good reasons believe that they can obtain therapeutic results from the whole of the constituents of a drug as produced and combined in nature's laboratory, which are unobtainable from any of those constituents when administered alone. Hence, fluid extracts, or valoids, have, during the last few years, become largely used, and methods for extraction in a concentrated form, more particularly by the use of the percolator, have received considerable attention. We should scarcely like to see pharmacy take a retrograde step even to the extent of 50 years; but in our rapid march of progress we are tempted to ignore or overlook the more simple means of accomplishing our object even though the results obtainable are quite equal to those produced by the more elaborate methods. If we take a herb or crude drug of a succulent nature and submit it to careful or efficient pressure, we separate, in the form of juice, the greater part of the activity of the plant in an unaltered condition, mixed probably with some matters inert or contributing to its instability, but these are readily removed and its preservation is easily accomplished. There are, however, difficulties attendant on the use of drugs in a fresh state, such as that of transit in quantity and for any distance without fermentation or incipient change of some kind; hence drying is very generally adopted as a means of preservation. Many drugs can be dried without detriment, whilst others lose much of their activity. A bark recently received from the west coast of Africa, and said to produce, if applied to the skin when fresh, all the rubifacient effects of a strong mustard plaster, possessed no such properties when it arrived here in a dry condition. A tree called Aurela, growing in the neighbourhood of Rio Grande do Sul, South Brazil, which possesses the power of acting in a poisonous manner, and of causing considerable swelling of the whole of the bodies of persons passing under or very near it, loses that power when dry. But when a drug retains its activity after drying, as it does in many instances, the most simple method of obtaining its properties in a concentrated form appears to be the restoration of moisture and subsequent expression. This treatment is specially adapted to leaves, of which senna may be taken as the type. Here we have a bulky material to deal with, and if percolation and evaporation be the means adopted there can be no doubt but the active principle becomes injured. Other examples may be found in *Convallaria Majalis*, *Damiana*, and *Hamamelis*. As matters of experience, I may mention that a customer who for some time had been taking a mixture consisting chiefly of essence of senna prepared by percolation and evaporation, became alarmed at the effect when the prescription was dispensed with an essence bearing the same relation to the crude drug but which had been prepared by pressure. A medical man who had been accustomed to take 40 minims of Fluid Extract of *Convallaria Majalis* which had been prepared by percolation and evaporation was compelled to reduce the dose (having suffered considerable nausea and other unpleasant effects) from the same quantity of fluid extract prepared by pressure. These instances are not adduced with a view to supporting an argument against percolation, in fact I use it for extracting such substances as cinchona, coto, cascara sagrada, *Berberis aquifolia*, etc., with very satisfactory results. For pressure, the menstruum and mode of procedure will vary somewhat according to the nature of the substance operated on. In the case of senna leaves, for fluid extract, to each pound is added 16 fluid ounces of a mixture of equal parts of rectified spirit and water, placed in a covered vessel for a period of from four to six hours, then put in bags and subjected to hydraulic pressure of, say, 50 tons or more until it ceases to yield any liquid. The marc is then broken up and moistened with water (which becomes readily absorbed) and again submitted to pressure; the latter treatment is repeated, and the result should be 16 ounces of fluid which has permeated and been forced through the vegetable tissue operated on, representing in an unaltered condition, as nearly as possible, the whole activity of 1 lb. of senna. The press which I use gives a maximum pressure of 70 tons and has a large table or pressing surface available for various purposes. It is adapted to the preparation of fluid extracts by the addition of a moveable block faced with a thick wrought iron plate, a similar plate being placed in the tray or pressing box on the table, which thus provides sufficient drainage. The oil press of Messrs. Tangye and Co. is a good one for pharmaceutical purposes; it has a ram of 10 inches diameter, giving a maximum of 150 tons pressure and is moderate in price.

The Pharmaceutical Hydraulic Press made by R. Dudgeon, of New York, is more compact, the pump cylinder being made to surround that containing the ram. It only gives, however, a pressure of 10 tons, and I have no personal experience of its working. An illustration of it is given on page 225 of 'Remington's Practice of Pharmacy.' This short paper deals very incompletely with a subject of considerable importance, but if it leads to an interesting discussion, and to experimental work by others who have more time at their disposal for the purpose than myself, the object for which it has been written will be accomplished.

The PRESIDENT having moved a vote of thanks to Dr. Symes,

Mr. CONROY said he had had considerable experience in making fluid extracts by maceration and pressure, and the results were generally better than those obtained by percolation. At the same time he did not say this method was suitable for all substances, and experience

was the only safe guide. In the case of senna, he had made a fluid extract in large quantity by the process mentioned, with the exception that in the second maceration he used equal parts of spirit and water, because he found that by putting water on powdered senna such an amount of mucilage was extracted that it was impossible to pass it through a filter. He did not know how Dr. Symes had managed to succeed so well, and his experience was that maceration would not do in many cases; with buchu for instance.

Mr. NAYLOR said he had had a good deal of practical experience in making various pharmaceutical preparations, and he thought it would not be wise to recommend pressure in general, but rather that discretion should be used, based upon a knowledge of the characters of the various plants. The objection he had to this method was that he knew of very few leaves, if any, which were capable of being exhausted by so small a quantity of water as Dr. Symes represented. He thought 1 pound of senna leaves would require much more water to exhaust them than would be represented in the final product of 16 ounces. On the other hand, plants containing a considerable amount of resinous principles were very difficult to extract, as a rule, and he did not think the process would answer very well unless supplemented by some amount of evaporation, such as was recommended in the latter part of the process for the preparation of fluid extracts by the United States Pharmacopœia. On the whole he rather favoured, as a general rule, exhaustion by combined maceration and percolation and evaporation at very low temperatures.

Mr. WILLIAMS said he had prepared essence of ginger in considerable quantity by the method described in the paper, using pressure by means of a Tangye's hydraulic press to the amount of 150 tons. In order to get the best results he found it necessary not to use a very strong spirit, or it was very difficult to percolate. He used this process principally because he could obtain the products so much more quickly than by percolation, and the method of pressing in cloths between plates was rather troublesome. He had tried it on a small scale, using one of Burrough's Enterprise presses, and probably if a large press on that principle were made the process might be made very rapid indeed, the time required for maceration being very small. Using the hydraulic press he got a good result giving only sufficient time for the spirit to be absorbed.

Mr. GERRARD said his experience rather led him to agree with the views expressed by Mr. Naylor, that, taking it all round, maceration, percolation, and evaporation at low temperatures was the best process for general extraction. He also thought that the amount of fluid spoken of would not be sufficient for the extraction of a drug like senna or buchu, in which there was a large quantity of mucilage; but as Dr. Symes mentioned that he used a certain quantity of rectified spirit with the water, that might remove the difficulty produced by the mucilage. The presses generally used in pharmaceutical establishments on a small scale were mechanically very much at fault. When a substance was submitted to pressure it would often be found that the outer portion would be deprived of its moisture, while the inner or central portion would still retain a considerable quantity of fluid, which it was very difficult to remove by any of the common presses.

Mr. GROVES had for many years employed this process for making essence of senna, and found the proportion of spirit required was one to three of water; and with that strength he found no difficulty with regard to the mucilage. In applying this process however, in any case, one must face the necessity of wasting a certain amount of material. If complete exhaustion were attempted, failure would result, but he was quite satisfied to throw away a fourth of his senna, knowing that what was lost in quantity was gained in quality. In fact, he had had complaints that his senna was so active that it must contain jalap, scammony, or something of the kind. Evaporation was very injurious to senna, and he had a strong objection to attempting exhaustion in any case. He had often carried on the process of percolation, and found that the further exhaustion was carried the worse was the product; and at last it was difficult to say whether it was worth getting at all. On the whole he thought it more advantageous to throw the residue away after three-fourths of the product had been obtained. Time was saved and the product was better.

Mr. RANSOM thought pressure might advantageously be used in many cases where it was not employed at present. In making belladonna liniment he produced by strong hydraulic pressure an article quite equal to that produced by percolation, and it could be made much more economically. Possibly the different experience of different makers might be due to some extent to the fact that some were dealing with much larger quantities than others. In quantities too small for hydraulic pressure to be employed percolation might answer best, but where it was practicable to use hydraulic pressure he thought it would be found more advantageous.

Mr. MARTIN said this paper raised a question of great interest, on which further research was desirable. With reference to the statement that senna and convallaria were more active when prepared in this way, he should like to ask Dr. Symes if the preparation had been made from the same samples of drugs, and if they had been tried on the same patients. He had always practised percolation and repercolation, and had not had much experience in preparing extracts by pressure; but if Dr. Symes's view were correct it was very desirable that further researches should be made with the aid of medical men.

Mr. PLOWMAN said he was about to ask the same question as had just been put by Mr. Martin. When any conclusions were drawn as to the medicinal effect of any drug or preparation, it should be known accurately how the preparation was made and from what material. It was evident that if the preparations had been made from different specimens of the drug the results were not very valuable, or at any rate were not conclusive. He had had no experience of the respective merits of percolation and repercolation and of pressure simply, and therefore he must be pardoned for asking a question which seemed rather away from the main issue. He understood Dr. Symes to say that there was a tree in South America which was capable of producing general swelling all over the body of any one who went near it. This reminded him of the stories of the upas tree, which were found to be more or less apocryphal, and he should like to ask in all seriousness whether the tree referred to had been identified, and what was its name and natural order, and what were the sources of information. If there were such a tree on the habitable globe it would be worth a journey to South America to investigate its qualities on the spot.

Mr. HOLMES remarked that several trees belonging to the *Anacardiaceæ* had been stated to possess the properties Dr. Symes had mentioned. Many trees of the *Rhus* genus produced very similar effects on some persons, although much less so on others. No doubt the tree referred to belonged to the same family.

Dr. THRESH said with regard to the therapeutic side of the question, he understood Dr. Symes to say that the extract of *Convallaria* had been tested in one case and produced not an intensified degree of its peculiar effect, but simply caused nausea. In that case he should rather think that something was introduced into the preparation which ought not to be there. He

should want further or different evidence before he came to the conclusion that in the case of *Convallaria majalis*, pressure really produced a more efficacious preparation.

Mr. MARTINDALE said one disadvantage of pressure was the danger of contamination, because you could not keep a tincture press clean. He preferred percolation on that ground.

Dr. SYMES in reply said, referring to Mr. Conroy's remarks, that the formula he had given was the result of a number of experiments, and of considerable experience. He found, putting 16 fluid ounces of spirit and water in equal parts to 1 lb. of senna, and subjecting it to pressure, in the first instance he would only get about 8 ounces of fluid, from which it was obvious that there were still 4 ounces of spirit in the senna. He therefore added water, and this answered to some extent Mr. Conroy's question. If he used more pressure, and got out more spirit, and then added more water, there would be a certain amount of mucilaginous substance; but as a matter of experience he did not find that interfered with getting very satisfactory results in the finished product. He agreed with Mr. Groves that you could not exhaust, absolutely, by this or any other method advantageously. In the case of senna the same sample was used for percolation and evaporation as was employed in the pressure process; in the case of the convallaria it was not so. But in the former case the effect was so marked that the patient came to him and said he wanted to speak to him privately. He (Dr. Symes) thought he, the customer, wanted him to prescribe for him, and he said he had no place for speaking privately in, but should be glad to hear what he had to say. The customer then said he thought one of the young men must have made a mistake, for he had sent him something which acted very powerfully. Of course he explained that it was not the fault of the young man at all, but that he had altered his method of preparing the senna. They might be sure he did not go through all that without taking pains to assure himself that increased activity was really produced. He admitted that the senna was not perfectly exhausted; but if from a pound of senna you got a pound of fluid extract by one process, and then by another you got an essence possessing twice the effect from the same senna, it did not matter whether you exhausted the senna or not. The only way of getting over the difficulty in this instance was to reduce the essence to one half its strength, and in that form it was dispensed and gave perfect satisfaction. It was not anything new, it was simply a matter of practice, which he thought worth calling attention to. In the case of the convallaria it was a different sample, and he tried several experiments before he could satisfy the medical man, who in that case was also the patient, that the preparation was a good one, for he would hardly believe that heat would injure the preparation, pointing out that tea could not be made with cold water. For that reason he made some experiments with several specimens of convallaria. The extreme nausea was no doubt occasioned by his taking an overdose; when it was reduced considerably he got the same effect as had been previously. The question put by Mr. Plowman as to the tree had been partly answered by Mr. Holmes, but he might say that his information was obtained from Dr. Landel, a member of the Conference, and a medical man in active practice in the Rio Grande, who assured him he had been called in to patients suffering from the effects of this tree, though it did not affect him much. The press he used was a large one, with an iron bed 3 feet × 2 feet, and a hard wood block put across it, and faced with a half-inch plate of wrought iron; the lower table had a tray of wrought iron, lying in which was a corresponding plate of iron an inch thick; one lot of material was packed on that, then another layer, then another plate, and so on, but he did not believe in pressing too much at a time. They used to be able to recover a good deal of spirit from the extracts obtained by ordinary pressure, but with the pressure obtained in this way the marc was frequently not worth distilling. The Tangye's press he had seen struck him as being admirably adapted to the purpose.

The next paper read was on—

OIL OF CAJUPUT.

BY WM. WEST, F.L.S.,

Lecturer in Botany and Materia Medica at the Bradford Technical College.

Having had a fair quantity of this article pass through my hands and seeing it noticed in the *blue list* as a subject requiring further investigation, I determined to see if I could do a little towards what was desired. I have used much of this oil and have also recommended it extensively to histologists in place of oil of cloves for the purpose of transferring sections from alcohol to Canada turpentine. I find that it penetrates more quickly than oil of cloves and that it is more readily expelled from the Canada turpentine afterwards. The number of samples I have had have been so very uniform in colour, odour, etc., and also in serving well for the more particular purpose for which they were required, that I did not expect to find much difference with regard to any samples I should more minutely examine.

In the following list I have placed the fourteen samples I examined in the order of their specific gravities, which were taken at 15·5° C.

No.	Spec. Grav.	Colour.
12	922·6	Bluish-green.
13	923·1	Pale bluish-green.
14	923·2	Pale bluish-green.
8	923·4	Pale bluish-green.
10	923·4	Very pale bluish-green.
1	923·4	Pale yellowish-green.
5	923·4	Bluish-green.
4	923·4	Full bluish-green.
11	923·5	Pale bluish-green.
6	923·6	Pale bluish-green.
3	923·6	Pale bluish-green.
2	923·6	Full bluish-green.
7	923·9	Very pale bluish-green.
9	924·0	Pale bluish-green.

No. 1 was distinctly fluorescent, the only sample I ever saw which possessed this character.

The boiling point of the above examples was found to vary from 174° to 174·5° C.

After boiling the colour changed to a light brownish-yellow, and with continued boiling to a deep brownish-yellow.

Some of the specimens were examined for copper by the test detailed in 'Pharmacographia,' and it was found in all of them. I applied another method which I thought could be done more rapidly, and by anyone; instead of shaking up the oil with diluted hydrochloric acid and precipitating the copper on platinum by means of zinc, I shook it up with diluted sulphuric acid, separated the latter from the oil, and added ammonia in excess; this gave a distinct blue colour.

I could not distinguish any difference in odour between any of the samples, not even on boiling.

Two portions of some of the palest examples were compared after adding a few bright copper turnings to one of them and agitating at intervals, with the result that those which had been in contact with the copper assumed a full bluish-green colour.

I have tried to obtain some Bornean camphor oil but could not succeed, the examples I received being ordinary camphor wood oil, which could be detected by its odour if mixed to any extent with oil of cajuput.

The specific gravities of the camphor wood oils I received were 944·3 and 944·4 at 15·5° C. These pale yellow camphor wood oils after repeated agitation with bright copper turnings also changed to a bluish-green colour, one assuming a very deep tint. The boiling points were 179·5° and 183° C.

Oil of eucalyptus (of commerce) might be used as an adulterant if the price were much less, but its odour is perceptible when mixed with oil of cajuput to any extent. The specific gravity of the eucalyptus oil I examined was 900·3. I also found it to be coloured pale bluish-green after agitation with bright copper turnings. Its boiling point was 170° C.

Since writing the above I have had the opportunity of examining an example of oil of cajuput which a friend had had in stock for a long time. It was pale brown in colour, and showed no trace of the usual bluish-green tint. A small quantity of a pale brown deposit had accumulated at the bottom of the bottle. The odour was just like that of the other examples, but the specific gravity was 919·4 at 15·5° C., being the lightest I have met with.

The specific gravities and boiling points of each example were repeatedly checked, with the same result.

The PRESIDENT having moved a vote of thanks to Mr. West,

Dr. THRESH said the Conference was glad to receive this paper from a new contributor, but he was sorry Mr. West had not gone rather more deeply into the subject and investigated the character of these oils a little more fully. As a matter of fact, all the oils with which he was acquainted as being used either as substitutes for cajuput, or for adulterating it, such as eucalyptus oils, were dextrogyre, whereas oil of cajuput was lævogyre. Unfortunately, Mr. West had not attempted any optical examination, and the boiling point, odour, and many other physical properties of these oils, so closely resembled those of the genuine oil that it was only optically that the difference could be detected. A very simple way of detecting the presence of copper was mentioned, but it was well known that the presence of a little copper tended to uniformity of colour, and he thought that was an advantage which out-weighed any objection to it. When he first heard the suggestion for using cajuput oil in section cutting, he was rather dubious about it, but a few experiments he had made fully confirmed what Mr. West had stated. It was more penetrating than oil of cloves, and he found that it more easily drained from the slides, and when the Canada balsam was afterwards applied it flowed more readily, and the whole process of mounting could be conducted more rapidly. No doubt, in a short time the oil would be largely used for this purpose.

Mr. NAYLOR said he was not aware that there was any novelty in the suggestion to use this oil for histological purposes, though he did not know that it had ever been published, but certainly about fifteen years ago he distilled this oil, and he knew it was largely used by microscopists then.

Mr. BURFORD remarked that there appeared to be considerable differences in the specific gravity of this oil as given by different observers, and he should like to ask Dr. Thresh whether he thought the fact of the oil being lævogyre was a sufficient criterion of its purity, or whether very slight influences might not make that test almost unworkable. Only last week he had detected the presence of copper in a specimen.

Mr. MACEWAN thought the Conference was highly indebted to Mr. West for bringing forward this paper. Three or four years ago, when he was examining some Borneo camphor products, Mr. Jamie, who had lived a long time at Singapore, gave him a good deal of information about them. He told him that the oil, which was a totally different thing from the camphor wood oil to which Mr. West referred, came out of the tree as soon as it was tapped. The Borneo camphor seemed to be a sort of alteration product of this oil. Ordinary camphor wood oil was distilled from the wood, and differed very much in appearance from that he had referred to. The difference between Borneo camphor oil and the oil of cajuput was not so very great, and he understood that it was largely used as an adulterant. If a few chips of copper were put into Borneo camphor oil from the Malay Archipelago, in a few days it was very like cajuput oil, and it was quite possible to add a little of the former to the latter without producing any change in appearance. For this reason he thought it would be very desirable to determine whether cajuput oil itself varied at all in specific gravity and other points; if so, it would be strong evidence that it was adulterated with camphor oil. But he took it from the paper there was not this difference. He believed ·922 was the lowest specific gravity mentioned, but he thought a French author had determined it to be ·930, and that it was lævogyre, which was an important point; but some of the oils of eucalyptus were dextrogyre and some lævogyre. However it was not very likely that the makers of cajuput oil in the Malay Archipelago would adulterate it with eucalyptus oil, which would have to be imported from Australia, and he was not aware that the oil was liable to sophistication in this country. He thought Mr. West had pretty clearly proved that the oil was not adulterated, as Mr. Jamie had supposed, or else that the operators were very expert in the art of adulterating, seeing that the camphor oil was always under ·880.

Mr. MARTIN wished to emphasize Dr. Thresh's suggestion as to the importance of optical examination, and mentioned that Carl Zeiss made a small portable polarimeter at a moderate price which would be very suitable for such purposes. He learned the use of cajuput oil in mounting slides from the late Henry Deane, and had used it for twenty years, and was under the impression that it was well known amongst microscopists.

Mr. PLOWMAN said he could not allow the statement to pass unchallenged, that the objection to the presence of copper in this oil was more than counterbalanced by its causing uniformity of colour. The author had shown that there was a wide divergence of colour in various samples, but they all contained copper. If they could get a uniform oil brought over, not in copper vessels, why should copper be put into it. It was stated by authorities on materia medica that oil of cajuput when recently prepared from fermented fresh leaves had a green colour; whether that colour was permanent without the addition of copper he did not know, but if it were, it would be much better to get over the oil properly prepared, and of its own proper colour, than to put in copper wilfully and after all obtain a non-uniform colour, as Mr. West had shown. He had not seen any redistilled oil, and should like to know if it was free from colour.

Mr. NAYLOR said it was quite colourless. As to the specific gravity, ·924 was the highest given in the paper.

Mr. MACEWAN remarked that this oil was not imported in copper vessels, but in baskets containing about two dozen wine bottles. The copper came from the stills used in distilling the leaves.

Dr. THRESH said he did not suggest the addition of copper for the sake of obtaining uniformity of colour. He believed the oil was distilled in copper vessels and imported in beer and wine bottles, and that the green colour was derived from the still. He had also found it stated that when freshly distilled, even without the presence of copper, the colour was decidedly green, but in a short time it faded, whether from exposure to light or not he did not know. Every practical pharmacist knew that the oil of eucalyptus with which they

were supplied by wholesale houses was always of such a tint that it could be used without the possibility of anyone cavilling at it, and saying it was not the article he required. Out of about twelve samples mentioned in the paper, nine were said to be of a pale bluish-green, one only was not a bluish-green, so that there was fair uniformity. Examination by polarized light was not always of value, but where it was of such extreme value as in this case, he thought it should be employed. All genuine oil of cajuput was lævogyre, whereas the majority of the oils used as adulterants were dextrogyre.

Mr. F. PASSMORE remarked that it had been rather assumed that the green colour was always due to the presence of copper, but he might mention that Mr. Histed read a paper some time ago, in which he quoted a statement from Guibourt that he had distilled melaleuca leaves for the express purpose of clearing up this point, and got a distillate of a beautiful green colour.

Mr. FLETCHER asked if any one had noticed of late years that mixing equal parts of cajuput and olive oil gave an opalescent product? Formerly such a mixture was quite clear, and he thought perhaps the opalescent effect was due to the presence of water or alcohol.

Mr. GROVES remarked that some years ago Piesse made an investigation of oils having colour, and found azuline, a volatile oil of a blue colour, which he extracted, he believed from eucalyptus oil, but certainly from oil of camomiles.

The next paper was on—

LARD: ITS ADULTERATION WITH COTTON SEED OIL AND DETECTION THEREOF.

BY MICHAEL CONROY.

The purity of lard for use as an ointment basis is a matter of some importance, and consequently the British Pharmacopœia directs it to be made from the perfectly fresh internal fat of the abdomen of the hog; and, according to the same authority, it should respond to the following characters and tests: "A soft, white, fatty substance, melting at 100° F. (37·8 C.); has no rancid odour; dissolves entirely in ether. Distilled water in which it has been boiled, when cooled and filtered, gives no precipitate with nitrate of silver, and is not rendered blue by the addition of solution of iodine." These tests are very good so far as they go, but they are, unfortunately, not sufficient for the misapplied ingenuity of the present day.

It has recently been shown by the United States press that cotton seed oil is used to an enormous extent for the adulteration of lard, which may be seen by the opposition given to a Bill introduced into Congress for the prevention of this adulteration. The Mississippi Legislature passed resolutions against the Bill; the Merchants and Cotton Exchanges of New Orleans sent protests to Congress against it; while the *New Orleans Times* calls it a Bill to reduce the value of cotton seed 50 per cent. The following titbit is from the *Nation*: "We cannot see any difference between this Bill and one which should seek to put a clog on new inventions. The discovery that butter can be made from the fat of a slaughtered ox as easily as from the cream of a living cow was a great boon to mankind, and one which cannot be suppressed, although it may be temporarily crippled by legislation. The discovery that the sun's light and heat work the same result in the production of edible fats in the seed of the cotton plant as in the fruit of the olive or in the bodies of swine is akin to it, and is likewise a benefit to the human race. Why should Congress undertake to prevent the diffusion of this blessing? If the proposed Bill does not prevent it, the measure will be useless to those who clamour for it."

The value of these quotations is apparent when we consider the vast quantity of American lard that is imported into this country. I have no statistics at hand, but I think it is under the limit to place it at one-half the total consumption, and we are told by the *American Oil and Drug Reporter* of April 4 last that "the pure food laws of England have in no way interfered with the sale of American refined lard, and no complaints have come to the surface, which is good evidence that the article gives satisfaction under the rigid scrutiny of exacting foreign buyers." Since this date, however, a change has come over the spirit of the *Reporter's* dream, for the matter has been vigorously taken up and several prosecutions have been carried, but as the adulteration is a paying one, it is not likely to be easily crushed.

Fortunately, the presence of cotton seed oil in lard is easily detected, and my object in bringing the matter under your notice is to lay before you some of the tests that I have myself tried. The first is the nitric acid test, which some years ago I had the honour of reading a paper on before the Liverpool Chemists' Association, in connection with the adulteration of olive oil. It consists in heating and stirring well about half an ounce of lard with one-tenth its weight of strong nitric acid, specific gravity 1·42, in a porcelain dish of about 8 ounces capacity until brisk action commences, when it should be removed from the source of heat. Pure lard sets in about an hour to a pale orange coloured solid, like citrine ointment, but if adulterated with cotton seed oil it takes a more or less deep orange-brown tint, according to the extent to which that oil is present. There are two drawbacks to this test, the first being that lard sometimes contains a small amount of water, which reduces the strength of the acid, causing the action to be less energetic, and thus leading to error; the second is that the difference in colour between pure and adulterated samples is not sufficiently definite when the adulterant is under 5 per cent.

I have also tried the test proposed by M. Labiche, who says that when cotton seed oil is treated with subacetate of lead and caustic alkali, it gives almost immediately an orange-red reaction. The author mixes equal parts of the oil and a saturated solution of neutral acetate of lead and adds ammonia, stirring briskly. The acetate of lead decomposes and the nascent oxide reacts upon the oil, causing it to turn red. If 20 per cent. of cotton seed oil be present the sample is said to turn red at once, lesser quantities show after some time. In my hands this test has proved an utter failure, but I think it may be due to the fact that the cotton seed oil which I used in my experiments was highly refined, and it is quite possible that the crude oil would give this reaction.

The next test is by Ernest Milliau, and was proposed by him for the detection of cotton seed oil in olive oil. It is an excellent test and quite applicable to lard. It is as follows:—In a porcelain capsule, holding about 1 litre, 15 c.c. of the sample in question are heated to 110°. Then, whilst still continuing the heat, we pour upon the oil a mixture of 15 c.c. of a solution of soda of 40° Baumé in distilled water and of 15 c.c. of alcohol of 92 per cent. When the mass has become homogeneous we add, drop by drop, so as not to cool the paste and form clots, about half a litre of distilled water. After boiling for a few minutes the fatty acids are separated by means of pure sulphuric acid diluted to one-tenth As soon as the separation is complete and the sulphuric acid is in slight excess, 5 c.c. of the hydrated fatty acids are collected with a silver spoon and poured at once into a test tube, about 3 c.m. in diameter and 12 in length. We add 20 c.c. of alcohol of 92 per cent., and heat slightly in the water bath to dissolve the fatty acids. When the solution is effected 2 c.c. of a solution of silver nitrate (30 grams in 100 c.c. of distilled water) are added, the tube is placed in a warm bath and heated until about one-third of the mass is

evaporated. The tube is then removed from the water bath. Whatever the origin of the sample, its fatty acids remain unaltered if the sample be pure. But if cotton oil is present the silver is reduced and blackens the fatty acids, which rise to the surface. In this manner one per cent. of cotton seed oil can be detected in olive oil.

In using this test for lard instead of for olive oil, as intended by its author, a brown coloration instead of a black one is obtained in samples containing cotton-seed oil, while pure samples remain perfectly white, and I find it better, instead of adding the half litre of cold water, "drop by drop," to use boiling water. For delicacy and reliability this test leaves nothing to be desired, and its only drawback is the time it takes to perform.

Another test for the detection of cotton-seed oil in olive oil, dependent upon the nitrate of silver reaction, is given by Bechi as follows:—5 c.c. of the oil are mixed with 25 c.c. of 98 per cent. alcohol, and 5 c.c. of silver nitrate solution (prepared by dissolving 1 gram of the nitrate in 100 c.c. of 98 per cent. alcohol), the mixture is heated to 84° C. If cotton-seed oil be present, the mixture becomes coloured, but not so if the oil be genuine. It is necessary to avoid heating by the direct flame, as other oils which may be present, such as linseed, colza, etc., will give colorations.

This, unlike the previous test, is not quite suitable for the detection of cotton-seed oil in lard, because lard sometimes contains traces of sodium carbonate, due to the fact that this substance is commonly used in washing lard that has become rancid. Slight traces of sodium carbonate decompose the silver nitrate, and the subsequent heating reduces it, causing samples of genuine lard to become darkened in such a manner that they might possibly be condemned as impure.

For several weeks past I have tried these and other tests with the object of finding the most reliable and expeditious, and my experience is, that those dependent upon the reduction of silver nitrate are the best, and the following *modus operandi* has given me results that are entirely satisfactory and reliable, and only requires a few minutes time:—

1. Make a test solution containing 5 parts of silver nitrate and 1 part of nitric acid (specific gravity 1·42) in 100 parts of rectified spirit (specific gravity ·838).

2. Melt a small quantity of the lard to be tested in a water-bath and pour about 100 grains of it into a dry test tube, about half an inch in diameter. To this add 20 grain measures of the above-mentioned test solution and place the tube in *boiling* water for five minutes, taking care that no water enters it.

Pure lard *remains perfectly white*, but if adulterated with cotton seed oil, it assumes a more or less olive-brown colour, according to the amount present. The colour is best seen when the lard sets, and it saves time to put the test tube direct from the boiling water into a vessel of cold water.

The presence of 5 per cent. of cotton seed oil in lard gives a very decided olive-brown coloration with this test, and 1 per cent. gives a colour quite distinct from genuine lard. The addition of nitric acid to the test solution is intended to neutralize any traces of alkali or alkaline carbonate that may be present, and it also prevents a slight reduction of the silver nitrate which takes place in genuine lard. It must not be forgotten that some samples of lard might possibly contain sodium chloride, though I have never met with any, in which case the silver nitrate would be precipitated as chloride instead of reacting on the oil, but this would be at once seen by the white curdy precipitate that would be formed.

The PRESIDENT having proposed a vote of thanks to the author of the paper,

Mr. THOMSON said he had made a number of tests on this subject, and his feeling with regard to the nitrate of silver test, which was certainly a very delicate one, was that if there was no reaction you might feel sure that the lard contained no cotton seed oil; but if there was a reaction you could not be sure that it indicated cotton seed oil, because so many other substances would give the same reaction. The most accurate test he could find, which was not at all satisfactory, was the determination of the amount of iodine absorbed by the oil. If there was a large amount of absorption you might be sure that the lard was not pure, but if you got only the right amount of absorption you could not be sure that it was pure, because, if a certain amount of the lard oil was abstracted the solid fatty acids had a less absorptive power for iodine than the lard oil itself, and consequently a certain amount of cotton seed oil might be added without detection. At present he was experimenting with a view to get over that difficulty by freezing or cooling the lard, and then pressing it between blotting paper, so as to remove the oily matters, and then extracting the oil from the blotting paper and testing its power of absorbing iodine. He had made a number of experiments on the process described by Bruce Warren, acting on it with chloride of sulphur and bisulphide of carbon, and so vulcanising the vegetable oils, and the results showed that with a mixture of lard and cotton-seed oil, the precipitate which first formed was soluble in the sulphide of carbon, and secondly, when this vulcanising process was continued for several weeks, pure lard itself would give an insoluble precipitate, so that the results obtained were not satisfactory. Up to the present time, in fact, no thoroughly satisfactory test for the purity of lard had in his opinion been discovered.

Mr. GROVES asked how the consistency of the lard was maintained if 50 per cent. of oil was added? Was the oily portion of lard removed first?

Mr. CONROY said he believed that was how it was done.

Mr. MASON remarked that there was no direction in the British Pharmacopœia that the lard used for ointments must be the product of a hog reared in Chicago, and he did not suppose that a pharmacist requiring to use lard would be very likely to use the American kind known as Armour's. The amusing paragraphs quoted in the paper were probably more of a political nature than anything else, the real object being to break down the enormous cotton trust which Mr. Armour had in his hands. Was there any reason why cotton-seed oil should not be as good, or better than lard? In the United States and in Canada it was superseding olive oil to a large extent for cooking purposes, and was preferred by many people. He would ask Mr. Conroy whether he had used Armour's lard in his experiments, or lard which had been rendered in his own laboratory, and had cotton-seed oil added to it. He did not think it probable that cotton-seed oil of so crude a nature as Mr. Conroy suggested as possibly accounting for some of the discrepancies in his tests would be used for adulterating purposes, because the best possible methods were employed to get it in a pure state. It was largely sold in two forms, one in the ordinary condition, and the other as "olive flavour," when intended as a substitute for olive oil. He had lately seen a paragraph in one of the London papers to the effect that olive oil was now being manufactured from sunflower seeds.

Mr. DOTT said a manufacturer of cotton-seed oil confided to him some time ago that the finest quality was principally used for the manufacture of margarine.

Mr. CLAGUE thought this paper would do a great deal of good. If they were to use cotton-seed oil for cooking purposes, let it be called by its own name, or any other which might be devised, but it ought not to be called lard. Speaking to a large importer recently,

he was told that three-fourths of the lard was adulterated with cotton-seed oil, and that it was no use legislating on the matter; if it were called lardine, or anything else, they would sell just as much; and he pointed to the instance of margarine and butterine. He then asked him whether anything could be obtained commercially which was guaranteed pure lard, and he said yes, but they wanted 8*s.* a cwt. more for it. He did not think 1*d.* a lb. would deter a pharmacist from getting what he wanted, and the tests brought forward by Mr. Conroy would enable him to make sure that he had the right thing. It was quite possible that cotton-seed oil might be very good for making ointment with, but for that, as for cooking, let it go under its own name.

Dr. SYMES said, although a large quantity of lard might be procurable which did not contain cotton-seed oil, since a great deal came over which contained not 5, but 20 or 30 per cent., it was very important that some trustworthy and easily applied test should be used. There was a great difference between olive oil and cotton-seed oil, which was a drying oil. If their American friends wished to press on them their Columbian salad oil, let them send it over under its real name of cotton-seed oil, but they certainly had no use for it in the form of an adulterant. He did not think the failure of the test which Mr. Conroy had mentioned could be due to the fact of a crude oil having been used, for crude cotton-seed oil was nearly black, and would not be used for such a purpose. In refining it underwent a process of partial saponification with a caustic alkali, by which about 20 per cent. was converted into a dark coloured soap, leaving the remainder a very fine pure oil, with nothing to be desired except that it should go under its proper name.

Mr. GEO. WARD said this question of the purity of lard was of considerable importance to pharmacists. He remembered that some twenty years ago he frequently found it adulterated with water to the extent of 12 or 14 per cent., and it was really improved in appearance. The water was added as the lard was cooling, and by dexterous stirring the lard was made to appear much whiter than it would without the water. It was most difficult to procure a sample of pure lard, and if any test could be devised which would enable the pharmacist to determine the purity or otherwise of a sample without difficulty it would be a great boon. The lard was pressed and the olein sold at a much higher price than the lard itself was worth, its place being supplied by cotton-seed oil. He had tried the Bechi test for cotton-seed oil in olive oil and had not found it answer satisfactorily, but had not tried it with lard. Perhaps his failure was partly due to the fact that he had not taken the test from the same source as Mr. Conroy, but from the *Analyst* and the *Pharmaceutical Journal*, in which there was a misprint of one grain instead of one gram of nitrate of silver. Having found it too dilute he increased it to a gram, but even then did not get a satisfactory result. He thought further evidence was required that the Bechi test or any modification of it was applicable in all cases. They were told in some quarters that the reducing action of the silver was due to the yellow colouring matter in the oil; but they knew that cotton-seed oil was very highly refined, and though that which had lately been imported was highly coloured, it was possible to deprive it of its colour altogether, and in that event the test might be inoperative.

Dr. THRESH asked if Mr. Conroy had examined Irish lard. A few weeks ago, when going from London to Cork, he happened to get on board the vessel an hour before the time of sailing, and noticed a number of casks being put on board from the wharf. One of them had the head knocked out, and seeing it contained some kind of fat, and that there were hundreds of these casks about, he asked one of the men what it was they were taking over to Ireland. His reply was that he did not know what it was then, but he knew it was refined lard when it came back.

Mr. CONROY, in reply to Mr. Thomson, said he did not think there were any substances which would cause the same reaction with nitrate of silver in the manner he applied it; none had come under his notice, but he should be glad of any further information Mr. Thomson could give him. Mr. Mason asked why not use cotton-seed oil, and he knew there was a notion that when highly refined it was quite as good as the best olive oil. It was really a splendid salad oil in every sense of the word, and he understood that many confectioners actually preferred adulterated lard, because it made better pastry; but his contention was that it ought to be called by its proper name. Mr. Clague said pharmacists would not mind paying another penny to get genuine lard, and he might say that many of the specimens he tried came from pharmacists, and not one of them was adulterated. The only adulterated samples were those he made himself by adding 5 per cent. of cotton-seed oil to them. Of course the adulterant was not used to that small extent, but generally in the proportion of about 30 to 40 per cent. A sample that he added 20 per cent. to was better in appearance than before it was adulterated, very likely owing to the stirring. When he used the term "crude oil," he did not mean the crude black kind, but something not so highly refined as the best brands now in the markets.

The Conference then adjourned for the day.

Wednesday, September 5.

The proceedings were resumed on Wednesday morning, at 10 o'clock, when the first paper read was a—

NOTE ON INSECT POWDER.

BY WILLIAM KIRKBY, F.R.M.S.,
Pharmaceutical Chemist.

Insect powder cannot be considered of much pharmaceutical importance; it is, however, of very great interest from a commercial and domestic point of view. Seeing that there is a large demand for the article and only a limited supply of the best kind, it is not surprising to find that it is largely adulterated by unscrupulous dealers. In 1881 (*Pharm. Journ.*, [3], xi., 1052) Mr. Consul St. John recommended that Dalmatian insect powder should be imported direct from Ragusa, as the merchants at Trieste were in the habit of making fraudulent additions.

About two years ago it was suggested to me by a firm of wholesale druggists that a simple microscopic description of the genuine powder, together with a means of detecting the presence of an adulterant, would be acceptable. I had hoped to do more than this and make a complete examination of *Chrysanthemum cinerariæfolium* and *C. roseum.* To this end some of my friends obtained samples of insect flowers, in all their stages of development, and used their best endeavours to obtain entire plants as well as all available information concerning them. One correspondent, writing in reply, says, "We are sorry to be unable to furnish you also with plant and seed, as we have none here, nor are we in a position to give you any information about the mode of cultivation, etc." Information concerning the plant seems to be very meagre, and such as has been published at different times is not of the most reliable kind. For the present my intention must therefore remain unperformed, and I shall content myself with briefly describing the tissues of the flower heads, and incidentally point out how an adulterant could be detected.

Chrysanthemum cinerariæfolium, B. et H.—This is the plant yielding the whole of the Dalmatian insect powder. The unopened flower heads of the wild variety are generally thought to furnish the most powerful insecti-

cide. The plant belongs to the *Compositæ*, sub-order *Tubuliflorœ*. In the florets of the ray the limb consists of an upper and a lower epidermal layers; the former of these has the cells developed into papillæ, which in the dry state become laterally contracted and readily break away from the base of the cells and are easily found in the powder; the opposite sides of these papillæ enclose an angle varying between 55° or 60° and 90°; the walls are finely striated (Fig. 1); the lower epidermal cells are elongated and have sinuous walls. The nerves are composed of narrow spiral tracheæ. The florets of the disc consist of elongated parenchyma, most of the cells containing a solitary small klinorhombic crystal of calcium oxalate, or, less frequently, a small stellate cluster of crystals. In the reproductive organs the only cells requiring comment are the papillæ of the stigma, which are longer than broad and almost cylindrical. The pollen grains are very abundant in the powder, they are globular and furnished with spines (Fig. 1), and have a dia-

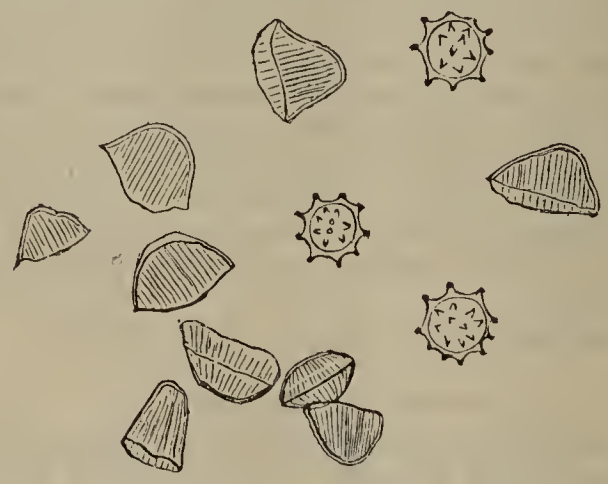

Fig. 1.—Pollen grains and epidermal papillæ of ligulate florets of *Chrysanthemum cinerariæfolium*. × 185.

meter of from 30 μ to 40 μ. Sclerotic, elongated, pitted cells and narrow spiral vessels form the tissue of the involucral scales, the cells becoming membranous at the margins. The disc consists of irregular parenchyma and fibrovascular bundles containing many spiral vessels. In the peduncle the parenchyma is made up of large cells with walls bearing few, large pits which are very sparsely distributed.

Fig. 2.—Pollen grains and epidermal papillæ of ligulate florets of *Chrysanthemum roseum*. × 185.

In a powder which should contain only the foregoing histological elements, any admixture of mineral matters, starches or starch-bearing tissues, sclerogenous or libriform tissues, epidermal tissues bearing hairs or glands, acicular raphides and most crystal-bearing tissues, should be distinguished without much difficulty. There is a possibility, however, of the substitution in this country of the Persian insect powder, obtained from *C. roseum*. It is said that this kind is not often met with, and I have been unable to obtain an authentic sample; but considering that it is cheaper in price and inferior in its action it is not unlikely to be found as a substitute. Mr. Jackson, of the Royal Gardens, Kew, has kindly provided me with a specimen of the flower-heads of the Persian species, *C. roseum*. The histological characters are almost identical with those of the species already described. There is, however, one distinction which affords a means of detecting it in the powdered state. The papillæ of the ray-florets are *larger* than those of the Dalmatian plant, are *somewhat thickened at the apex*, and have sides making an angle of between 20° and 50° (Fig. 2). After an acquaintance with the genuine powder the stronger-looking papillæ of *C. roseum* can be recognized with tolerable facility.

For the help of those with but little microscopic experience it may be well to add that a mixture of equal parts of a solution of caustic potash (20 per cent.) and glycerine makes a very suitable fluid in which to examine the powder.

The PRESIDENT having proposed a vote of thanks to the author,

Mr. GREENISH congratulated Mr. Kirkby on having produced another paper showing the usefulness of the microscope, not merely in pharmacy, but commercially, as a means of detecting admixture or adulteration. By the aid of the drawings which he had prepared, any one with a little knowledge of the microscope would be able to determine whether a sample of insect powder was adulterated.

Dr. SYMES asked if Mr. Holmes could inform them whether the *Pyrethrum cinerariæfolium* was really as active as the *P. roseum*. He understood the former was the only kind which had been available of late years.

Mr. CONROY said he had noticed that Mr. Kirkby did not give any characters of the stem of the flowers, though portions of stem would occur in most samples of ground flowers, and they would probably present under the microscope a very similar appearance to some of the adulterants commonly used. So far as his experience went, the insect powder was not adulterated in this country, but before it reached here, as was evident from the fact that the powder could be purchased abroad 20, 30, 40, or even 50 per cent. below the price paid for the flowers. The most common adulterant he believed was fustic, and it was often coloured with chrome. There was not so much deep coloured powder in the market as formerly.

Mr. GREENISH asked if it was really a question of adulteration, or was it merely admixture through carelessness.

Mr. CONROY thought the price of the powder as compared with the flowers was conclusive proof of adulteration.

Mr. HOWIE said this paper might be useful from a scientific point of view, but from his own experience he had very little faith in microscopic observation for ascertaining the value of an insect powder. When a few years ago working with the then common chrome-coloured powder, not being himself a skilled microscopist, he had on three occasions handed over specimens to pharmacists who were skilled in the use of the microscope, and although in two cases he knew the powders were adulterated, because he had done it himself, they were certified to him as genuine. He thought the blackbeetle test was the best after all. He had lately heard of another adulterant, and in some cheap powder sold at a cutting shop, a large proportion of potato starch had been found. A professional chemist, however, who was also a microscopist, could detect no foreign starch until he subjected it to a chemical test on the stage.

Mr. ROBINSON said he was interested in this question from a business point of view, and he understood that some doubts had been expressed whether this powder was really fatal to the animal kingdom. If it

were so extensively adulterated it might be that the poisonous property was introduced in the adulterant. It seemed to him that its action was that of choking, and that with regard to the blackbeetle test, those insects were not actually killed, but only prevented returning to their residences. He should be glad to know if the plant could really be termed poisonous.

The PRESIDENT said he did not know whether this powder was commonly used as a garden insecticide, but he had used it this year for the greenfly on roses and found it better than anything else; it was simply blown on with a bellows, and killed the fly without in any way injuring the plants. He had also prepared a tincture, which when mixed with water and used with a syringe was equally effective. This would tend to show that the powder did contain a poisonous principle.

Mr. HOWIE said he had known it successfully used as a simple infusion in the manner just spoken of.

Mr. GREENISH remarked that there was a great difference between a simple examination under the microscope and what might be termed a histological investigation, such as Mr. Kirkby had conducted, employing certain solutions and reagents in conjunction with his microscopical examination. He knew there were some doubts whether this powder was really an insecticide, and he had heard it stated that it merely stupefied the insects and rendered them inert for a time.

Mr. MACEWAN said when he was in Edinburgh Mr. Hodgkinson of Macclesfield sent him a specimen of *Pyrethrum roseum*, which he said grew abundantly in that neighbourhood, and if its value as an insecticide were proved, there would be no difficulty in cultivating it. The flower was practically the same as those exhibited, only of a dark red colour, almost magenta.

Mr. CONROY said he had found the fly test better than the blackbeetle one Mr. Howie referred to. He took two or three beakers, put half a dozen flies in each, covered them over with a little muslin, and dusted the powder through it. In that way, if you had two or three samples, you could tell in two or three minutes which was the best.

Mr. GERRARD said he had had the doubtful satisfaction on one occasion of witnessing the effects of powdered pyrethrum on blackbeetles. He thought it would be interesting to test whether it acted simply as a local irritant, and for that purpose he sprinkled some on the posterior extremities, where he found it had the same effect as when applied in front; which showed that it did act as a local irritant. If taken internally the action would probably be the same. He did not think it was a poison in the same sense as the toxic alkaloids and glucosides.

Mr. MASON said he had always understood that the action of this powder was to produce a kind of asphyxia, and the fineness of the powder might have a certain importance in making physiological tests such as Mr. Conroy had mentioned. In one instance he had a sample of Dalmatian insect powder, which contained about 60 per cent. of sumac, about 30 per cent. of powdered African camomiles, and if there was any insect powder in it, that made up the balance. During last summer, when insect powder was very scarce, powdered Barbadoes aloes was on one occasion found quite as effectual.

Mr. MARTINDALE said there was some principle in this powder which undoubtedly had an influence beyond its mere mechanical effect as a dusty powder, causing choking. There was a note in the 'Year-Book' for 1881, by Mr. Pringleberg, in which a tincture of Persian insect powder made with 1 oz. to 10 oz. of absolute alcohol was recommended as an efficient protection against fleas, sprinkled over the bed linen by means of a spray producer. In the *Times*, also, about twenty years ago, he remembered a celebrated African traveller stating that he had used a tincture of Persian insect powder with the best results as a protection against the *tsetze* fly, which was so troublesome in some parts of Africa. A similar action was produced by the common tansy, which was sold in the north of England for similar purposes. It also belonged to the order of *Compositæ*, and had a strong odour.

Mr. MASON asked if Mr. Pringleberg's preparation was an alcoholic tincture?

Mr. MARTINDALE said the tincture recommended in the note was in absolute alcohol.

Mr. MASON said he asked the question because he understood it was said that the active principle lay in some fatty matter, which was only to be obtained in an ethereal tincture.

Mr. HOLMES said the object of this paper, as he understood it, was to point out the character of insect powder when free from adulterants, so that those who had to examine it might know what features should be present, and that any other appearances would indicate either an adulterant or an admixture. He had given the characters of the *Chrysanthemum roseum* and *Chrysanthemum cinerariæfolium*. The general idea was that the Dalmatian powder was more powerful than the Persian, which had in consequence gone comparatively out of use. He would remind Mr. Conroy that Mr. Kirkby had given a description of the features present in the peduncle. He quite agreed with that gentleman as to the powder not being adulterated in this country, but he should be glad to know what grounds he had for supposing that fustic was used as an adulterant.

Mr. CONROY said his only ground was information received from people who sold the fustic.

Mr. HOLMES, referring to the remarks on the insecticidal properties of the powder, said that if the 'Year-Books of Pharmacy' for 1880-3 were consulted, several papers on this subject would be found, in one of which it was stated that a volatile acid had been found in the flowers, which had the power of causing dizziness in the human subject. He did not think it had been proved to be actually poisonous, but the question was worth further physiological investigation. A gentleman in Hull wrote to him a few days ago, saying that a case had occurred in his neighbourhood before a coroner in which a man had been poisoned by insect powder. Whether the death was due to the powder itself or to some adulterant which had been put into it he could not say, but he had a sample of the powder, which he should send to Mr. Kirkby for examination. Mr. Gerrard had spoken of the insect powder as being a local irritant, but he hardly thought that was the correct term, because it certainly produced a stupefying effect on insects. In the 'Year-Book of Pharmacy' it was recommended as a test to give 4 grains to a fly, which would become stupefied, and in a short time would die. It occurred to him that in some respects a tincture would be the best form in which to test the efficacy of the powder as a poison. It might be interesting to know that some essential oil, such as that of cedar, if rubbed on the face or skin, kept insects at a distance, as he had proved lately when in Scotland. The oil of tansy was well known to be poisonous, and no doubt there were in the British flora several plants of the same natural order which might be utilized for insect powder.

Mr. MASON said oil of cedar was commonly used in America in a combination known as mosquito oil, but he doubted whether the remedy was not worse than the evil.

The next paper read was on—

A Proximate Analysis of the Seeds of Cassia Tora.

BY WILLIAM ELBORNE, F.L.S.,

Assistant Lecturer in Materia Medica and Pharmacy, Owens College.

The fetid cassia (*Cassia Tora*, L.),* a common leguminous weed or gregarious undershrub, from one to two feet in height, occurs abundantly and widely spread throughout India and Burmah.

In Sanskrit the leaves and seeds of the plant are termed *Chakra mardana* (*Chakra*, a wheel or ring, and *Mardana*, to kill) on account of their constituting a valuable remedy in ringworm and all kinds of skin diseases; they are also said to possess gentle aperient properties. The seeds are used in the arts for dyeing silk of a yellow colour, and are regularly sold to the indigo dyers of Mysore, who use them to obtain certain effects which they otherwise cannot produce. The leaves are used for rubbing upon parts stung by bees, just as dock leaves are used in this country to relieve the pain caused by the sting of the nettle.†

The following paragraph, relating to the commerce of this drug, is taken from the *Chemist and Druggist* (Oct. 29, 1887):—

"*Coowaree Seeds.*—At the last drug sales fifteen bags of pale coffee-coloured seeds, cylinder shaped, and about one-eighth of an inch in length, the ends being somewhat oblique, were offered for sale. No one appeared to have the slightest idea of their use, and the lot, altogether about 22 cwt., was withdrawn. The parcel was imported here from Bombay, and we understand that the seeds have been identified by Mr. Holmes as the seeds of *Cassia Tora*, Linn., or oval-leaved cassia, called *Kulkul* by the Arabs and *Peti tora* by the natives of Ceylon. The shrub, which attains a height of about five feet, grows in most parts of British India, and is extensively cultivated by the natives for the sake of its leaves, which play an important part in Hindoo pharmacy. It also grows in Japan, and has been found in Central America by Houstoun. In Cochin China, also, it is very common, but in the latter country it does not seem to rank among the medicinal plants. The *Cassia Tora* seeds, ground with sour butter-milk, are occasionally used as a cure of itchy irruptions; but the leaves, which are strongly mucilaginous and of a highly disagreeable odour, are a household remedy among the Hindoos. They are administered in the form of a decoction. Fried in castor oil they are used as a cure for foul ulcers, and finally, rubbed up with lime juice, they form a popular remedy for ringworm. For the latter purpose, and in a similar manner, the root is also used. In Western India a blue dye is also made from the seeds in combination with *Nerium tinctorium*, Roxb. The seeds have been imported into this country before now, but it does not seem that there is any demand for them."

Estimation of Moisture.—10 grams of the finely powdered seed heated in a water oven until it ceased to lose weight lost 2·72 grams = 27·2 per cent.

Ash.—The residue from above ignited in a platinum dish left 0·8 gram. of mineral matter = 8 per cent.

I. *Petroleum Ether Extract.*—20 grams of the original finely powdered seed were macerated with petroleum ether for 24 hours with frequent agitation, filtered, and the residue washed with additional menstruum until the filtrate measured 100 c.c. Of this extract 20 c.c. evaporated on a water bath left a fluid residue of a bright yellow colour weighing 0·39 gram, which solidified on cooling (temperature of the laboratory at the time was 55° F.); it was partially soluble in absolute alcohol, imparting a yellow colour, completely soluble on application of heat, was readily saponified with solution of potash, forming a bright crimson-coloured solution, the fatty acids of which on decomposition with a mineral acid were thrown out as a bright yellow precipitate. Petroleum ether extracted therefore 9·75 per cent. of fat and appeared to be associated with some anthraquinone derivative, which latter it will be more convenient to identify in the estimation following.

II. *Ether Extract.*—The seed residue from I. after further washing with petroleum ether and drying was exhausted by maceration and percolation with ethylic ether until the clear product measured 100 c.c.; it was of a bright yellow colour.

17 c.c. (=3·5 grm. seed) on evaporation yielded ·03 gram of a yellow coloured residue insoluble in water. Soluble in rectified and proof spirits, soluble in aqueous potash with a blood-red colour, reprecipitated by dilute hydrochloric acid in excess as a copious brown precipitate; its proof spirit solution is precipitated by lime water. In all its reactions and behaviour it bears a great analogy to chrysophanic acid, but on account of its greater solubility in ether and alcohol (sp. gr. ·800–·920) it corresponds rather with emodin, a substance closely allied to chrysophanic acid in composition.*

It may here be incidentally remarked that Dr. Dymock in his 'Vegetable Mat. Med. of Western India' alludes to the chemistry of the leaves, seeds and roots of an allied species of Cassia (*C. sophora*) in the following terms:—"This plant, like several others of the same genus, owes its medicinal activity to the presence of chrysophanic acid, sometimes called Rhein. It is contained in Goa powder, rhubarb, most varieties of dock, *Lichen orcella*, *Parmelia parietina*, *Cassia alata*, *C. occidentalis*, *C. Tora*," etc. (*Pharm. Journ.*, vol. ix., [3], p. 756), (Macmillan). Upon verifying this reference however, it does not appear that the statement is based upon experiment, but inferred from the analogous therapeutic action of these seeds. The original passage in Macmillan's paper is as follows:—"The fact that the juice of the dock leaf allays the irritation caused by the sting of the nettle may be ascribable to the fact of its containing chrysophanic acid, as does the *Cassia alata*, which is common in the mountain province of Ceylon, as is also *C. occidentalis*, *C. sophora*, and *C. Tora*, whose leaves and roots possess the same therapeutic properties."

Ether extracted 0·86 per cent.

III. *Absolute Alcohol Extract.*—The seed residue from II. was dried and exhausted with alcohol according to methods I. and II. 1·83 per cent. of a reddish-brown substance was left after dissipation of the solvent on a water bath. It was freely soluble in water, not precipitated by potassio-mercuric iodide nor with subacetate of lead, gave a blood red coloration with soda, potash and ammonia, but precipitated with lime water, and gave a blood-red coloration with strong sulphuric acid. Its aqueous solution imparted nothing to ether when agitated with it. The aqueous solution boiled with dilute hydrochloric acid for ten minutes became brown and turbid on cooling; turbidity

* *Synonyms.*—(Indian and Chinese vernaculars, etc.). *Chakónda*, *Panwár* (Hind.); *Tákla*, *Kowaria* (Bomb.); *Ushit-tagarai*, *Tagarai* (Tam.); *Sanga saboyah* (Pers.); *Kiueh-ming-tsze* (Porter Smith, 'Chinese Mat. Med.'); *Keue-ming-tsze* (Hanbury's 'Science Papers'); *Tagaray-elley* (Ainslie's 'Mat. Med.'); *Ketsumei* (Miq. Prol.).

† The 'Vegetable Mat. Med. of Western India,' W. Dymock, p. 216. The Bombay 'Mat. Med.', R. N. Khory, p. 277. Colonial and Indian Exhibition, 1886 (special Indian Cat., pp. 70, 104, 150). 'Useful Plants of India,' Drury.

* Emodin is a derivative of methylanthracene, its constitution being that of trioxymethylanthraquinone $C_{15}H_{10}O_5 = C_{14}H_4 \begin{cases} CH_3 \\ O_2 \\ (HO)_3 \end{cases}$ Chrysophanic acid, to which it is closely allied, is dioxymethylanthraquinone.—Watts' 'Dictionary.'

removed by agitation with ether; the ethereal supernatant layer, which was of a deep yellow colour, when removed and solvent dissipated on a water bath left a residue, corresponding in its behaviour and properties with the ethereal residue in II.; the aqueous layer copiously reduced Fehling's solution, indicating that a glucosidal body had been decomposed, yielding emodin and glucose. This glucoside may therefore be regarded as potential emodin, just as chrysophan or chrysarobin may be regarded as potential chrysophanic acid;* it differs from chrysophan in not forming a yellow solution with concentrated sulphuric acid and with concentrated potash. The quantity of emodin yielded by decomposition of the alcohol extract amounted to ·9 per cent.

IV. *Aqueous Extract.*—The seed residue was exhausted by maceration in distilled water, filtered, and washed with water until the filtrate measured 100 c.c. The soluble constituents amounted to about 20 per cent., the albuminous substances precipitable by alcohol amounting to 6·3 per cent. This extract was not further examined.

Remarks.—The medicinal activity of *Cassia Tora* seeds is most probably due to the presence of this emodin, a substance closely allied to chrysophanic acid in chemical characteristics, and considering the purposes for which the natives of India use the plant, evidently in medicinal properties. The process which suggests itself for isolating this constituent is as follows:—Exhaust the powdered seed with proof spirit, filter, distil off the spirit, dilute with water acidulated with hydrochloric acid, boil for ten minutes, allow to cool, and agitate with ether, in which latter the emodin is dissolved.

It is interesting to remark that emodin has recently been extracted by Bachmann, from lichens (*Nephrona Lusitanica*)†; many lichens, as well known, yield chrysophanic acid (*Parmelia sp.*, etc.).

The PRESIDENT proposed a vote of thanks to Mr. Elborne.

Mr. NAYLOR said this investigation was one which called for a good deal of chemical knowledge, and he confessed to some surprise at the conclusion at which Mr. Elborne had arrived after apparently only a comparatively few experiments. He had given one or two characters, and from these few tests had inferred the presence of emodin, and a body analogous to chrysophan, which he proposed to call "potential emodin." He did not make these remarks in any disparagement of what Mr. Elborne had done, but rather in the hope that that gentleman would continue his investigations, and favour the Conference at a future meeting with a further communication, which perhaps might substantiate more thoroughly the conclusion at which he had arrived.

Mr. HOLMES said these seeds appeared to be very largely used in the east, and he had seen them in collections of drugs from China and Japan, but he doubted if they were likely to contain a principle of much value in comparison with chrysophanic acid. They were generally used in India mixed with other seeds which had also a reputation in skin diseases, such as *Psoralea corylifolia* and *Pongamia glabra*. The fact that they were not used alone, but were generally mixed with other seeds, seemed to indicate that they were not so powerful as to merit a physiological examination in this country. Whether the active principle was chrysophanic acid or emodin must be left to some extent in doubt, but Dr. Dymock stated without any qualification that it was the former.

(*To be continued.*)

*Chrysophan on being boiled with dilute hydrochloric acid splits up into chrysophanic acid and glucose (*Bull. Soc. Chim.*, [2], x., p. 293 (Kubly).

† *Ber. deut. Bot. Ges.*, v., 192.

Obituary.

RUDOLF JULIUS EMANUEL CLAUSIUS.

The death is announced of Professor Clausius, the distinguished physicist, at Bonn, on the 24th ult. Professor Clausius was born in 1822 at Cöslin, in Pomerania, and pursued his earlier studies in Berlin and afterwards at Halle. In 1850 he became a teacher of physics in connection with the University of Berlin, from which he removed successively to Zurich, Würzburg, and lastly to Bonn, where until his death he held the chair of Natural Philosophy. His investigations were principally in relation to questions of thermodynamics, and amongst other things it may be said that he was the first to place the kinetic theory of gases upon a scientific foundation. Professor Clausius was the author of numerous important papers besides his great work on the Mechanical Theory of Heat. He was a Foreign Member of the Royal Society, and in 1879 received the Copley medal.

Notice has also been received of the death of the following:—

On the 27th of August, Mr. Solomon Woodward, Chemist and Druggist, High Street, Cheltenham. Aged 52 years.

On the 30th of August, by drowning near Hastings, Mr. William Harry Ferguson, Pharmaceutical Chemist, formerly of Chancery Lane. Aged 32 years. Mr. Ferguson had been a member of the Pharmaceutical Society since 1877.

On the 4th of September, Mr. Frederick Johnson, Chemist and Druggist, Wilford Road, Nottingham. Aged 52 years.

On the 11th of September, Mr. Jonas Skelton Thompson, Chemist and Druggist, High Street, Sutton Coldfield. Aged 43 years.

Review.

MANUAL OF PHARMACY AND PHARMACEUTICAL CHEMISTRY. By CHAS. F. HEEBNER, Ph.G. New York. 1887.

The examination system has created a new literature. Books are written with the express aim of conveying in clear but abstract form, just that information which will prove useful to a student in preparing for any given qualifying test. To quote the preface of this short manual—"It is the outgrowth of a want long felt by students at the various colleges of pharmacy, for a book especially adapted to their use as a *class-book* or *note-book*. All the unnecessary matter of many text-books has been here eliminated."

Accordingly we have a manual in three parts; the first is devoted to a description of processes employed in pharmacy; the second contains a *résumé* of inorganic pharmacy and preparations, the main divisions being aqua, acids, alkalies and their compounds, alkaline earths and their compounds, the halogens and their salts, preparations of the metallic and non-metallic elements.

The third treats of organic pharmacy under the following headings:—The cellulin group, amylaceous bodies and their derivatives, exudations of plants.

The arrangement is good and the execution may be commended. No small amount of labour has been spent upon the compilation.

It is another question as to how far a student is benefited by being saved the trouble of writing a similarly arranged system of notes on his own account. The very trouble involved is of itself essentially advantageous, and notes, to be of more than temporary service, should be the result of the student's own reading, experiment, and observation.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

English Assistants in Italy.

Sir,—Mr. Groves, of Florence, was one of the correspondents who gave the President of the Conference information relating to pharmacy abroad.

I would like to protest against the severe remarks he makes on English assistants when contrasting them against Germans. I have no right to dispute the fact that he meets with excellent Germans; "*chacun à son gout.*" I find it, however, a frequent thing among Englishmen to underrate their own country and countrymen; it is so easy to magnify faults and to forget good qualities. But the idea hurts, to be so plainly told that we are so inferior to the Germans. *Toujours les Allemands*! Mr. Groves would have been fairer if he had qualified his remarks by regretting that pharmacy in England is so far behind the close pharmacy of the continent, and that general business predominates over true pharmacy. "Pharmacien et droguiste" may be dictionary French for "chemist and druggist," but the chemist and druggist is one man, while the "pharmacien" in his pharmacy has only to do with drugs and chemicals as applied to medicine, and the "droguiste" has the heavy work, which is the only support of so many English businesses. That makes all the difference in the world in the training of assistants, and blame is due to the system, not to the men.

This certainly narrows down the number of assistants whose experience would be serviceable to Mr. Groves in his continental business, and too many only pass the Minor for the sake of its qualification, and soon loose expertness in and knowledge of methods of analysis.

Has Mr. Groves failed to notice the large number of assistants' associations? He may not, personally, know any, but he ought to be able to judge that there are thoughtful, capable men, as evidenced by the papers they produce. From my knowledge of men of my own School of Pharmacy I certainly think that Mr. Groves could meet with men whose experience and capabilities would put then quite on a par with Germans. There are men of liberal education, for a good proportion of the rising chemists have passed the University Local examination. Quite likely it is but a few who have a colloquial acquaintance of a foreign tongue, for a language taught at school and "as she is spoke" differ widely. Here I take grave exception to Mr. Groves' views. Does he really mean that he can find Germans with such a thorough knowledge of English and English pharmacy that they are the equals of his own countrymen? And more than that, that they are also perfect in all things French and Italian? Florence is a meeting place for all nationalities, so I suppose these Germans know about everything pharmaceutical. Prodigious! How would an abbreviated Latin prescription have its directions translated? Why even their very handwriting is un-English, and apt to shake the confidence of a timid client. Do the doctors who frequent Mr. Groves' pharmacy place the implicit trust in German assistants that they do in Mr. Groves himself? Have his pet assistants a fair knowledge even of his English customers' wants? Young fellows of about twenty, before they have been through their military course. Very experienced men, certainly! Only last spring I worked side by side with one of the nicest Germans I have met, but he had to leave abruptly, as the time that his passport gave permission to stay out of his fatherland was expiring.

I doubt whether they are good Germans at all, these men Mr. Groves lauds so highly. Military duty seems irksome, and they escape it by staying out of their country. True patriots to hold up as examples to young Britons! So these men make themselves outcasts and roam about the Continent. A year in Switzerland, that country of so many languages, will make such men possessors of tongues sufficient to move on. Then a year in France will help them to distinguish a little more between "p" and "b;" a season spent in some Italian town will give them practice in Italian—the decimal system having, through all this, aided international work. From books and his stay in season towns he has now become acquainted with England and knows universal pharmacy—well, at any rate, enough to satisfy Mr. Groves. I have often talked over this question of assistants, English and Continental, with my confrères in other continental pharmacies, so I may profess to know something of what I have written, but we have always agreed that the English standard is rarely reached by others. A little work and a cigarette, no notions of stock-keeping, and no duties beyond the work of the moment—at business, shop-keeping, if you will, Mr. Groves, the German cannot hold his own with an Englishman.

I think it was Mr. Schacht who, in an address to students, described the skill required in wrapping up magnesia as one of the essential rudiments of business. How many continental assistants can wrap up magnesia or anything else? In conclusion I would add that our insular position prevents the ready intercourse with other nations, and makes the English a stay-at-home people, content with one language. With application they can acquire languages if they go and stay amongst the people speaking them. Mr. Groves should tempt a Bloomsbury Square student who has water and urine analysis at his fingers' ends, and perhaps in time he would, as a linguist, come up to a German. By-the-by, is it that it takes a larger salary to induce a good Englishman to settle away from home than to fix a Teuton? I have my ideas—and Mr. Groves has his.

I may have written warmly, but the motive for this will be understood when I subscribe myself

An Assistant on the Riviera.

Sir,—I have been reading in the address delivered by Mr. Benger to the British Pharmaceutical Conference Mr. Groves' views on Italian pharmacy. In the course of my residence abroad I failed to note the immense superiority "down to the finger ends" of the Germans or any other nation over us. I do know, on the contrary, a French pharmacy on the Riviera, where the solitary English assistant does the analyses so common in France; but I do not know that in pharmacies employing assistants of three or four nationalities that in the struggle for the survival of the fittest the German was selected on account of his "advantage of a more extended education." As to the matter of languages they are not taught in our national schools as in Germany, and from our insular position it is perhaps less necessary for them to be so; but Englishmen, coming out to a season resort, have mastered the language in a period not "ridiculously short," but long enough to master the grammar, etc., quite as well as any German.

Do representative English chemists in Italy employ Germans exclusively? No, decidedly not. Go the trip, as I did, through Italy from end to end, and you will find that Mr. Groves stands as solitary and peculiar in that he finds it obligatory to employ German assistants as he does in his depreciation of Englishmen.

If Mr. Groves had written that Englishmen are not so anxious to leave their country as Germans, and would not come for, and, to use his own expression, "squeeze through," on the same salary, I would have assented.

R. E. V. John.

A. E. Beard.—*Sison amomum* and *Obione portulacoides.*

Spiro.—*Epilobium angustifolium* and *Melilotus arvensis.*

A. S. M. asks for information as to the best mode of keeping and treating a tobacco plant through the winter. The plant has lately flowered.

Aconite.—(1) *Senecio Jacobœa.* (2) *Sonchus asper.* (3) *Senecio vulgaris.* (4) *Polygonum Persicaria.* (5) Send specimen with leaves. (6) *Mentha arvensis.*

J. E.—"Papain" is the name given to a ferment occurring in the juice of the papaw tree (*Carica Papaya*), which has now received some application in medicine. For full information respecting its properties and mode of separation see articles in this series of the *Pharmaceutical Journal*, vol. ix., p. 449; and vol. x., pp. 283, 343, etc.

C. R. H. Sims.—According to Stillé and Maisch, the active principle of *Spigelia anthelmia* has not yet been isolated, but the plant has had attributed to it narcotic as well as anthelmintic properties.

Communications, Letters, etc., have been received from Messrs. Higson, Brown, Moss, Alcock, Young, Balkwill, Reid, Binford, Evans, Eboracus, Viator, E. H. B.

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The Chemist and Druggist, Dec. 3, 1887.

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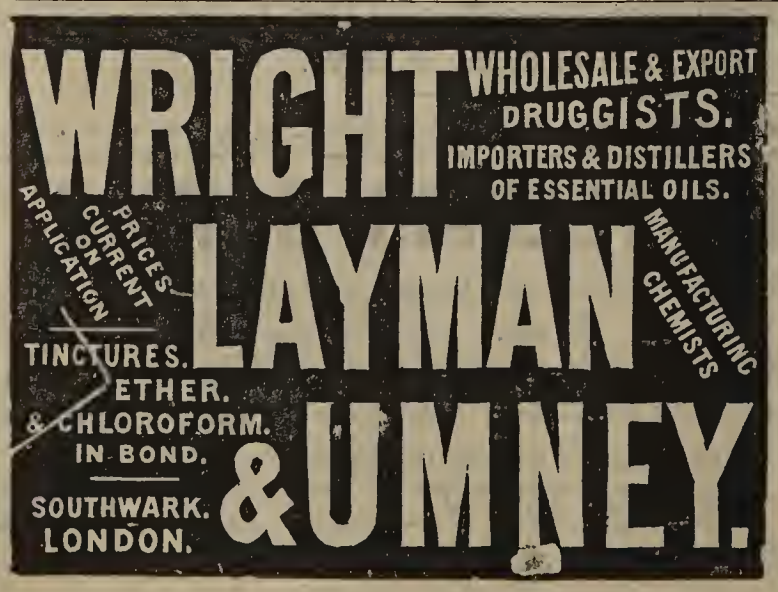

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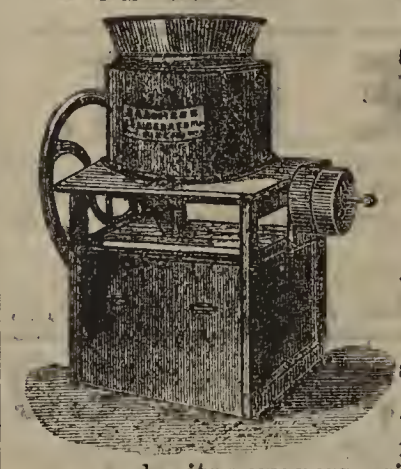

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Tubes, 2s. each. Half Tubes, 1s. each. Pomade in vials, 5s. HUMAN VACCINE, from healthy children only, microscopically examined and source quoted.—Three tubes, two-thirds full, 5s.; Tubes one-third full, and Lancet Charged Points, 1s. each; Pin-points, 1s. 1d. each. Eighteen Charged Small Points, 5s.

Tubes two-thirds full (same as those mentioned above, but without source), in quantities for export, £5 per 100 tubes.

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VACCINATIONS DAILY between the hours of 12 *and* 2 *by the Consulting Physician, at the uniform fee of a Guinea.*

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During the year ending at the July examinations, FORTY Students from this School passed the Minor, and several of them were commended by the examiners, both in London and Edinburgh, for the manner in which their work was done, a proof that Mr. Turner's Class System is useful in ensuring a thorough and practical knowledge of the subjects taught, as well as of obtaining a pass.

Full particulars of the Classes sent on application.

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Day and Evening Classes at moderate fees.

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Practical Chemistry	Mr. H. J. SALMON, A.I.C
Materia Medica and Botany	Mr.
Microscopy	Mr. MARTIN J. COLE.
Pharmacy	Mr MAURICE WILLIAMS.

Full particulars on application to the Secretary at the school.

PRELIMINARY & MINOR.

ALL Students who are preparing should send for particulars of a method of study which will enable them to pass with ease. Enclose stamped envelope to Mr. J. TULLY (Hills Prizeman), Chemist, Hastings. Established 1872. References to past and present Pupils. **35** Pupils passed the last Examinations.

STUDENTS' AIDS TO EXAMINATION.

PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 3d. Cæsar Simplified, 1s. Knotty Points in Latin Grammar, 1s. 6d. MINOR.—Equations Simplified, 1s. Illegible Autographic Prescriptions, 1s. Notes on Dispensing, 1s. Prescriptions given at the Minor, 6d. CHEMIST, care of Mr. J. Edwards, Wye, Kent.

Pharmaceutical Preliminary, London Matriculation, Apothecaries' Hall, College of Preceptors, &c.
Mr. A. H. DAWES, 1st B.A. (Lond.),
Continues his successful preparation, privately and in class. Students rapidly prepared by Postal Tuition. Candidates coached for Bell Scholarship. Class for Pharmaceutical Prelim., Monday or Thursday, 6 till 9, £1 1s. per 13 weeks. Address, 31, Southampton Street, Strand, W.C.

Guy's Hospital Medical School.—

The WINTER SESSION commences on Monday, October 1st.

The Hospital contains 695 beds, of which 500 are in constant occupation. There are Wards for Obstetric and Ophthalmic cases, and other special departments. Special Classes are held in the Hospital for Students preparing for the Examinations of the University of London, and other higher examinations.

APPOINTMENTS.—The House Surgeoncies, House Physiciancies, Dresserships, and all other appointments are made strictly in accordance with the merits of the candidates, and without extra payment. There are also a large number of Junior Appointments, every part of the Hospital practice being systematically employed for instruction, so that students who have completed their preliminary studies elsewhere may enter at once upon the practice of the Hospital. ENTRANCE SCHOLARSHIPS.—Open Scholarship of 125 guineas in Classics, Mathematics and Modern Languages. Open Scholarship of 125 guineas in Chemistry, Physics and Biology. PRIZES are open to students in their various years amounting in the aggregate to more than £300. During the past year the accommodation in the PHYSIOLOGICAL and PATHOLOGICAL Departments has been greatly increased, and a STUDENTS' CLUB has been opened in the Hospital, containing a dining room, reading rooms, and a large gymnasium.

COLLEGE.—A residential College is in course of erection upon a site immediately contiguous to the Hospital, to accommodate about 50 students in addition to the resident staff of the Hospital.

For Prospectus and further information apply to the Dean,

Dr. PERRY, Guy's Hospital, London, S.E.

The London Hospital and Medical

COLLEGE, Mile End, E.

The SESSION 1888-89 will commence on Monday, October 1st, 1888. The new buildings, which were opened by T.R.H. the Prince and Princess of Wales on May 21st, 1887, afford more than double the accommodation which was provided formerly.

Four Entrance Scholarships, value £60, £40, £30, and £20, will be offered for competition at the end of September to new students. Fees for lectures and hospital practice, 90 guineas in one payment, or 100 guineas in three instalments. All resident and other hospital appointments are free, and the holders of all the resident appointments are provided with rooms and board entirely free of expense. The resident appointments consist of five house physiciancies, five house surgeoncies, one accoucheurship, one receiving-room officer, and one senior dresser to outpatients. Dressers and maternity pupils also reside in the Hospital. Special classes for the Preliminary Scientific and Intermediate M.B. Examinations of the University of London and for the Primary and Pass Examinations for the Fellowship of the Royal College of Surgeons of England are held throughout the year. Special entries may be made for medical and surgical practice. The London Hospital is now in direct communication by rail and tram with all parts of the metropolis, and the Metropolitan, Metropolitan District, East London, and South-Eastern Railways have stations within a minute's walk of the Hospital and College.

For prospectus and particulars apply, personally or by letter, to

MUNRO SCOTT, Warden.

St. Thomas's Hospital Medical School,

Albert Embankment, London, S.E.

The WINTER SESSION of 1888-89 will commence on Oct. 1, when an introductory address will be delivered by Dr. Cullingworth, at 3 p.m.

Two entrance science scholarships of 125 guineas and 60*l.* respectively, open to all first-year students, will be offered for competition. The examination will be held on the 26th, 27th, and 28th September, and the subjects will be chemistry and physics, with either botany or zoology, at the option of candidates.

Special classes are held throughout the year for the "Preliminary Scientific" and "Intermediate M.B." examinations of the University of London.

An additional Laboratory for the teaching of advanced Physiology has been recently provided.

All hospital appointments are open to students without extra charge.

Scholarships and money prizes of considerable value are awarded at the Sessional Examinations, as also several medals.

The fees may be paid in one sum or by instalments. Entries may be made to lectures or to hospital practice, and special arrangements are made for students entering in their second or subsequent years; also for dental students and for qualified practitioners.

Medical practitioners, clergymen, and private families residing in the neighbourhood receive students for residence and supervision, and a register of approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Medical Secretary, Mr. George Rendle.

E. NETTLESHIP, Dean.

WESTMINSTER COLLEGE

The Lectures and Classes for the October and December Examinations have commenced.

The next two courses will commence on October 23rd and January 1st, entries for which can now be received.

Students can enter at any time, but are advised to commence their studies at the beginning of a course.

FEES (FROM OCTOBER 23RD):—

MINOR.

To the December Exam.	£5	5	0.	—February...	£9	9	0
Until Qualified	£12	12	0				
12 Months' (Minor and Major)	£15	15	0				

MAJOR.

To the December Exam.	£4	4	0.	—February..	£7	7	0
Until Qualified	£10	10	0				

During the past Session, **14** Students passed the Preliminary, **140** the Minor and **12** the Major Examinations of the Pharmaceutical Society.

At the last Pharmaceutical Examinations, **8** Major Candidates from this School presented themselves, **6** passed. The following **35** Minor Students were also successful.

MAJOR.

CARTER, B.	FORSTER, J. B.	WANT, W. P.
EVANS, J.	HEATON, S. W.	WRIGHT, J.

MINOR.

ARDEN, L.	HALL, A. J.	OGLE, J. H.
BAKER, H. W.	HITCHMAN, W.	PATCHETT, J.
BELL, J. H.	HORSLEY, E. S.	PEPPERDINE, H.
BROOKS, J.	JONES, J.	REID, D.
BROWN, L.	JONES, LL.	RUTHERFORD, W.
DOUGLAS, J. W.	LANCE, W. D.	STARK, J.
EYNON, C. J.	LONGDIN, T. W.	TUDOR, W.
GLOVER, F. J.	MASTERS, H.	TURNBULL, H. J.
GOOLD, B.	MORRELL, C.	TURNER, W. H.
GRIFFITHS, H. T.	NORTHWOOD, H. G.	WEST, G. W.
HATHAWAY, F. H. W.	NORTON, T. E.	WHITWORTH, J. W.
WILKINSON, T.	WILLOWS, H. G.	

EVENING CLASSES

Are held every **Tuesday, Wednesday, Thursday and Friday**, from 7 till 9 p.m.

The Thursday Evening Classes extend over a term of SIX WEEKS, and are intended for those students who have previously failed in the examination, or who wish to present themselves at the next examination. The course consists of six hours practical chemistry and six lectures (of one hour's duration) on the most important points in each subject. Fee for the course, **10s. 6d.**; or **2s.** each night.

The Tuesday Classes are intended for students who have studied the subjects previously. The course extends over a term of three months. It includes fourteen hours practical chemistry and fourteen lectures on all the subjects required in the Minor examination. Fee—Three months, **£1 1s.**

The Wednesday Classes are intended for those who are only just commencing their studies. The course extends over a period of 12 months, and includes one hour's practical chemistry and one hour's class each evening. Fees: For the complete course, **£3 3s.**; three months, **£1 1s.**

The Friday Classes are intended for those preparing for the Preliminary examination of the Pharmaceutical Society. Fee—Three months, **15s.**

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"Mr. Wills, of Westminster College, one of our most thoroughly successful tutors, extends him a helping hand, leaving it simply his own fault, and deserving it, if he blindly labours on in ignorant darkness."—*Magazine of Chemistry and Pharmacy.*

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Assisted by an efficient staff of Demonstrators.

The fees at this School are absolutely inclusive, and there are *no extras of any kind.* The Board of Directors spare no expense in rendering the education thoroughly efficient and in maintaining the very high percentage of success uniformly obtained by the students for the last 19 years. The Dispensing department is most commodious and perfect, and *no extra charge is made for its use.*

A new Laboratory for practical instruction in Manufacturing Pharmacy is now being added to the premises.

The School being usually full, intending students should secure their places beforehand. Entries are now being made for September 12, 1888, and for January 9, 1889.

For fees, &c., apply by letter addressed to the Secretary.

THE

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173, 175 & 177, Marylebone Road, N.W.

EVENING CLASSES

For Minor Students will be commenced on Monday next, Sept. 10th, at 7.30, and will be continued on Wednesday and Friday Evenings at the same time.

The next Course of Lectures and Classes for the December and February Examinations will begin on Thursday, October 25th. Fees to December, 6 guineas; to February, 10 guineas.

For Prospectus, apply to

Mr. JOHN WOODLAND, 173, Marylebone Road, N.W.

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INDIAN MEDICAL SERVICE.

India Office, 10th September, 1888.

AN Examination for ten appointments as Surgeon in Her Majesty's Indian Medical Service will be held in London in February, 1889. Copies of the Regulations for the Examination, with information regarding the Pay and Retiring Allowances, &c., of Indian Medical Officers, may be obtained from the Military Secretary, India Office, London, S.W. The exact date of the Examination will be announced hereafter.

ALLEN JOHNSON, Lieutenant-General,
Military Secretary.

ENGAGEMENTS WANTED.

Advertisements under this heading are charged as follows—Twelve words not exceeding two lines, or less, 1s.; each additional six words, or less, 6d.; two initials or two figures counting as one word.

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BEGINNING November.—By an energetic man, post of Working PARTNER, where the bringing out of own specialities would be accepted instead of capital. SPES, 43, East Hill, Wandsworth, S.W.

ASSISTANT. Age 26. 6 years experience. English and French. Salary no object. Time to study. Disengaged October. HARRY GELLEE, 42, Rue d'Auteuil, Paris.

LOCUM TENENS. Qualified. Experienced. Tall, teetotaler. HALL ROBERTS, Holbein House, Folkestone.

JUNIOR in Dispensing business. 4½ years' experience. Age 20. 6ft. 2in. R. H., Barron, Squire & Co., Bush Lane, E.C.

MANAGER with view to purchase, or LOCUM TENENS Age 40. Single. Disengaged on the 26th. BETA, Lewin & Co., 16, Market Pl., Boston, Lincoln.

ENGAGEMENTS WANTED.

AS ASSISTANT. Qualified. 24. 9 years' good experience. Abstainer. Disengaged early in October. B., Leamington House, Pittville, Cheltenham.

MANAGER or DISPENSER, Surgeon's or Chemist's, Temporary or permanent. JAMES DUNKERLY, M.P.S., 88, Morton Rd., Islington, N.

AS ASSISTANT. 5 years' country experience. Speaks French. Age 22. ALPHA, 51, Florence Rd., Stroud Green, London.

ASSISTANT or BRANCH MANAGER. Age 28. Tall. Experienced. BROWN, 3, Camden Rd., N.W.

WHOLESALE. 3 years' experience. Qualified. Age 23. Laboratory preferred. J. G., 1, Mostyn Rd., Brixton, S.W.

AS JUNIOR or IMPROVER. Time for study in lieu of salary. Speaks French, has knowledge of French Pharmacy. Age 21. First-class references. London preferred. W., Beech House, Wallington, Surrey.

A YOUTH, ætat 21, who has been 4 years in the Wholesale and is a good Dispenser, seeks a situation as IMPROVER in Retail or in Wholesale business. Address, PHARMACY, at Messrs. Mackey, Mackey & Co., 1 & 2, Bouverie St., Fleet St., London.

AS ASSISTANT in a light Retail and Dispensing business. Age 25. 8½ years' good experience. Satisfactory references. G. C., 215, Leytonstone Rd., Stratford, Essex.

BRANCH MANAGER or ASSISTANT. 30. Height 5ft. 6in. Good Prescriber and Tooth Extractor. References. Disengaged September 26th. KNIBB, 4, Springdale Rd., Green Lanes, N.

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RE-ENGAGEMENT. Wholesale or Retail. Married. HAMBLY, 25, Maynard St., Leicester.

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MAJOR student desires engagement, with time for lectures, &c. A.P.S., Mr. Tallent, Broomhall St., Sheffield.

ASSISTANT. Age 22. London preferred. 3½ years with present employer. Time for study. Small salary. Disengaged October 8th. W. R., 43, Bouverie Sq., Folkestone.

AS JUNIOR in a good dispensing establishment. Watering place preferred. Five years experience. Age 20. HY. SCOTT, Norman Swindle, Dispensing Chemist, Keswick, Cumberland.

IN London, with time for lectures. 5¼ years experience. 6 months in London. Small salary required. Excellent references. T. W., 32, Swinley Road, Wigan.

AS ASSISTANT. London preferred. Thorough experience. Minor. K.T., 1, Greville Ter., Cheltenham.

IMPROVER. Finished apprenticeship. Will give 6 months. 2½ years' experience. In or out-door. BARROW, 17, Bolsover St., W.

AS ASSISTANT. Out-door. Married. Age 34. Good experience and references. G. C., 30, Manchester St., Argyle Sq., W.C.

AS MANAGER. Thoroughly experienced. Qualified. Permanency. Single. Age 41. R. S., 2, Margaret St., Cavendish Sq., W.

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AS ASSISTANT. Permanency. Out-door. Age 31. Married. 15 years' practical experience in good class Retail. 7 years' reference from last employers. W., Messrs. Allen and Lloyd, Aldershot.

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DISENGAGED October 8th.—Branch MANAGER or ASSISTANT. Age 27. 10 years' experience. Height 5ft. 8in. Good references. Prescribe and Extract Teeth. MIDDLETON, 103, High Holborn, W.C.

DISPENSER to Surgeon, &c. Age 24. Disengaged. A. E. A., 16A, George St., Hastings.

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ASSISTANT. Outdoor. Front counter or DISPENSER, Age 26. COCAINE, 18, Merrick Square, Borough, S.E.

AS MANAGER. With rooms preferred. Age 27. Height 6ft. 13 years experience in town or country. Two good references for 5½ years as manager. Passed Minor and Hall examinations. MOORE, 10, Railway Terr., New Southgate, W.

A SENIOR ASSISTANT. Qualified. Good references. Shortly disengaged. S. M., 74, Deacon St., Walworth Rd.

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TEMPORARY or MANAGER. Thorough experience. Town and country. References. Abstainer. Registered. CHEMIST, 159, Copenhagen St., London.

ASSISTANT in first-class business. Preferably West-end. Good references. First-class Dispensing experience. Major. Age 24. J. J. DAVIES, Johnson's Pk., Newcastle Emlyn, Carm.

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QUALIFIED ASSISTANT. Age about 24. Good Counterman and Dispenser, and accustomed to a good class country business. Junior kept. Apply, stating age, height, salary, references, and enclose photo to RAE, Chemist, Newmarket.

ASSISTANT. Minor qualification. Single. Age about 25. Accustomed to Prescribing and good general business. In-doors. D., 244, Westminster Bridge Rd., London, S.E.

EXPERIENCED and trustworthy ASSISTANT required. Good Counterman. Out-door and no Sunday duty. State particulars of last two situations and all customary information, to TIMOTHY WHITE, Chemist, Portsmouth.

ASSISTANTS WANTED.

ROBERT WATTS, Pharmaceutical Chemist, Fargate, Sheffield, will require, about the beginning of October, a gentleman as JUNIOR or IMPROVER. Full particulars as to height, salary required, &c. In-door. Applicants please send photo (to be returned).

ASSISTANT, about 22, in-doors, that can be well recommended, for light Retail and Dispensing. Able to Prescribe and left in charge occasionally during absence of principal. Apply, stating age, reference, salary, with photo, to JOHN LEA, Folkestone.

ASSISTANT, in-door, for country business. Must be good Dispenser and able to take entire charge, sober, and reliable. Address, giving full particulars, Y. B. F., Mr. Banister, 3, Clayton Sq., Liverpool.

ASSISTANT, with Minor qualification preferred (Welshman), used to a good class country business. Permanency. Please send particulars to D. W. JONES, Chemist, Aberdare.

EARLY in October, a competent Junior ASSISTANT, of good address and business habits, for a light Retail and Dispensing business. One only kept. Hours 8 to 8. Shop closed on Sundays. Applications unanswered in three days declined. Apply, with full particulars, to Mr. GRISBROOK, Chemist to Her Majesty, Windsor.

AN ASSISTANT wanted, of good address and experience. Qualified. About 24 years of age. Apply to W. MALDEN & Co., 195, Brompton Rd., near South Kensington Museum, London, S.W.

AN out-door ASSISTANT, JUNIOR, or IMPROVER, able to converse in French. State age, height, experience, salary required, and enclose photograph, to CHEMICUS, 25, Clermont Ter., Preston, Brighton.

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STEELE & MARSH, Bath, require a JUNIOR early in October, must be of gentlemanly manners, and accustomed to good class Dispensing. Apply, enclosing carte (to be returned), with full particulars of age, height, salary required, and previous employment.

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AN out-door ASSISTANT. Salary £2 weekly. Apply, personally, T. S. BECKETT, 67, Victoria Dock Rd., London.

G. SHARPLES, Chemist, Electrician, &c., Preston, requires a thoroughly competent out-door ASSISTANT. The situation is a permanent one to a suitable man. No one need apply who has not had first class experience, or whose character will not bear the strictest possible investigation as to steadiness. Married or single. Qualification unnecessary if competent.

ON Oct. 8th, for a permanency, a competent ASSISTANT, of about 23 years. One only kept. Apply personally, or with carte and full particulars, to PHARMACIST, 103, High Holborn, W.C.

FOR Ceylon.—Qualified ASSISTANT required. Age 25 or under. Preference given to gentleman of scientific turn, having some experience in chemical analysis. State age and height. Send photo. Furnish usual particulars. Mr. Campbell, 11, Brunswick Sq., Gloucester.

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The
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Transactions.

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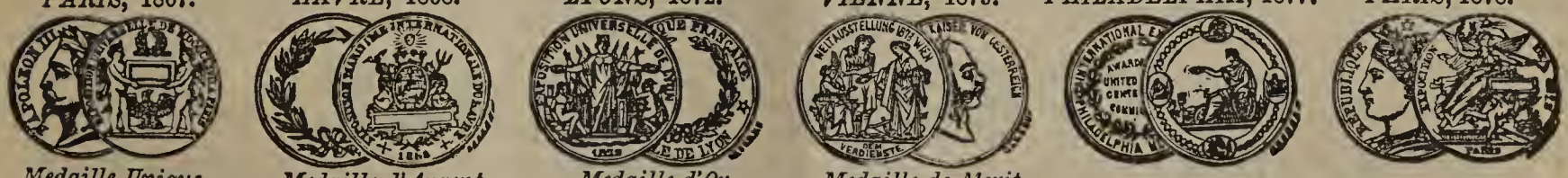

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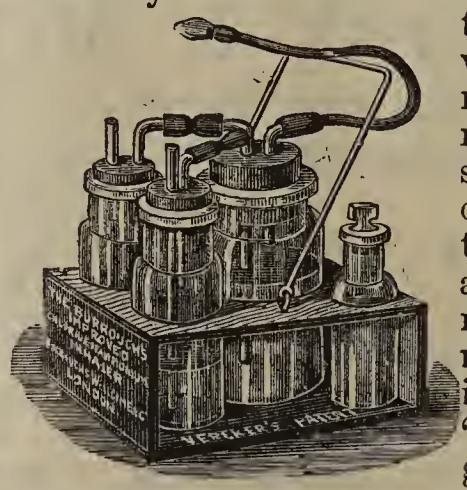

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"THE MONTH."

Amorphous Coca Base.

A very interesting contribution to the chemical history of the basic substances accompanying cocaine in coca leaves has been made by Professor C. Liebermann, and one that appears to have some physiological importance (*Berichte*, xxi. 2342). It is an account of the results obtained in the examination of about a kilogram of amorphous alkaloid obtained from coca leaves as a bye-product in the preparation of cocaine. This is described as a yellow, viscous, glutinous mass and is said to have represented that portion of the amorphous alkaloid which resists the action of potassium permanganate. The crude material was dissolved in dilute hydrochloric acid, filtered and shaken with ether, which removed a quantity of benzoyl hydride. From the residual solution, after removal of ether by a current of cold air, soda solution or ammonia threw down a precipitate which when separated and dried formed a white chalky amorphous product, equal to about 70 per cent. of the material used. This basic substance, which was ascertained to be practically homogeneous, showed great resemblance to cocaine, except that neither it nor its salts could be obtained in a crystalline condition. It was readily soluble in alcohol, ether, benzol and chloroform, being left in a resinous condition on the evaporation of the solvent, but it differed in its very spare solubility in light petroleum spirit. At first it was thought to have the same composition as cocaine, and Professor Liebermann was inclined to look upon it as one of the amorphous bases isomeric with that base referred to by Dr. Hesse (*Pharm. Journ.*, [3], xviii., 437) under the names "cocamine" and "cocaidine." But this proved to be inadmissible through its spare solubility in light petroleum spirit and the fact that benzoic acid was not a product of its decomposition. After a long and interesting examination the conclusion was arrived at that this companion of cocaine in coca leaves has the composition represented by the formula $C_{19}H_{23}NO_4$, and the constitution of a cocaine in which the radical of benzoic acid is replaced by an isomer of isatropic acid; it has therefore received the name "isatropylcocaine." Not the least important point in this communication is the statement that the physiological action of this base has been tested by Professor O. Liebreich, who reports that it acts as a strong poison, probably giving rise to the poisonous symptoms repeatedly observed when cocaine that is not perfectly pure is used. In its action it resembles neither cocaine nor atropine, and it is thought to be more probably a heart poison; no diminution of sensibility was observed either in its local application or general action. If therefore this base represents the principal constituent of that portion of amorphous coca alkaloid that resists the action of potassium permanganate it would seem to follow that the permanganate test for the purity of cocaine, upon which considerable stress has been laid by some writers, would not reveal the presence of a most objectionable contamination. In the residual liquor after the removal of this base some ecgonine was found, and from the occurrence of benzoyl hydride Professor Liebermann thinks it not impossible that "cinnamylcocaine" and similar compounds may occur in coca leaves.

A good illustration of the thoroughness with which chemical investigations are followed up in Germany is furnished by a communication from Messrs. Will and Bredig (*Berichte*, xxi., p. 2777), upon the influence of mass upon the conversion of hyoscyamine into atropine by alkalies, the reaction that was recently reported upon by Herr Will (*Pharm. Journ.*, [3] xviii., 1046). The paper records the inferences drawn from a large number of experiments in which hyoscyamine in solutions of different concentration was subjected to the action of different quantities of caustic soda, the data being calculated from the indications given by a polarimeter of the decrease of rotatory power, as marking the progress of the conversion of the hyoscyamine into atropine. It may be stated briefly that the results showed that, as in the case of the inversion of sugar by acids, there existed a constant relation between the mass and the time occupied in the conversion, or, in other words, that the same quantity of hyoscyamine treated with a given quantity of soda solution of a certain concentration, required four times as long for its complete conversion into atropine as when treated with an equal volume of soda solution four times as concentrated. The authors are further of opinion that the conversion of hyoscyamine into atropine under the influence of alkalies is a catalytic action, in the sense of the definition by Berzelius, the intermediate stage being probably dependent upon the rearrangement of the elements of water. In addition to this catalytic action there takes place very slowly, but more rapidly in proportion to the greater concentration of the alkali, a subsidiary reaction, which consists in the decomposition of atropine in the cold into tropic acid and tropine. Atropine has been found to be optically active, rotating polarized light slightly to the left (approximately $[\alpha]_D = -1{\cdot}89$). In order to obtain atropine as free as possible from hyoscyamine it is recommended to subject hyoscyamine in the cold to the action of a very weak solution of alkali until its optical rotatory power becomes constant. This has been found preferable to recrystallization of the gold salt. It is also stated, as being of manufacturing interest, that the conversion of hyoscyamine into atropine is also effected by sodium carbonate, and that ammonia is the slowest in effecting this change of all the bases examined. Whilst upon this subject it may be mentioned that Professor Schmidt has recently reported (*Pharm. Zeit.*, Sept. 26, p. 572) that he has found hyoscyamine in *Scopolia atropoides*, cultivated in Germany, and in *Anisodus luridus*, and that he has also separated small quantities of an alkaloid having the property of dilating the pupil from *Lithium barbarum*, *Solanum nigrum* and the fresh potato plant.

Hyoscyamine and Atropine.

Some time since, Herr Zeisel, guided by the results obtained in the investigation by analytical methods of the relations existing between colchicine and colchiceine, described colchiceine as acetotrimethylcolchicinic acid and colchicine as being the methyl ether of colchiceine. Reversing the process and proceeding synthetically, Messrs. Johanny and Zeisel, by heating trimethylcolchicinic acid with acetic anhydride, have obtained a product in no way distinguishable from colchiceine resulting from the saponification of colchicine (*Pharm. Post*, Sept. 16, p. 599). In addition they have succeeded

Colchicine and Colchiceine.

by the introduction of a methyl group into colchiceine in converting it into colchicine. This can be effected by the action of methyl iodide upon colchiceine-sodium, or by the passage of hydrochloric acid gas through a solution of colchiceine in methylic alcohol; but when the former process is adopted there is formed at the same time a dimethyl compound, or methylcolchicine, which is quite analogous to what takes place when morphine is similarly treated for its conversion into codeine. Methylcolchicine, unlike colchicine, does not form a crystalline compound with chloroform, which facilitates its separation. When boiled with very dilute hydrochloric acid it is changed into methylcolchiceine, $C_{22}H_{25}NO_6$, which resembles colchiceine closely, but is an isomer of colchicine. If methylcolchiceine be heated with fuming hydrochloric acid to 165° C., methylamine is split off, which is considered to indicate that the second methyl group introduced replaces an atom of hydrogen in the ammonia residue present in colchicine.

Rhinanthin.

A glucosidal substance, "similar to digitalin," obtained by Dr. Phipson from the common snapdragon (*Antirrhinum majus*), has been identified by him with rhinanthin, a glucoside extracted twenty years ago by Ludwig from the seeds of *Rhinanthus hirsutus* and *R. Crista-Galli* (*Chem. News*, Aug. 31, p. 99). Dr. Phipson describes rhinanthin as occurring rather plentifully in the leaves and stalks of the snapdragon, from which it can be separated by macerating the plant in cold water for a few days, filtering and treating the filtrate with a small quantity of lead subacetate, again filtering and removing any excess of lead, and evaporating the liquid to a syrup. After a few days rhinanthin separates in brilliant transparent colourless rhombic crystals, having a peculiar sweetish acrid taste and very soluble in water and in alcohol. A clear colourless aqueous solution of rhinanthin heated in a test-tube with a few drops of hydrochloric acid turns gradually brown, and just after boiling becomes dark and opaque, through the breaking up of the glucoside; a copious reddish-brown precipitate of rhinanthogen is formed and glucose can be detected in the liquor. This reaction is said to be a very delicate test for the presence of rhinanthin.

Myrtus Cheken

The leaves of *Myrtus Cheken*, which have been the subject of several partial investigations already reported in this Journal, have recently been submitted to a thorough chemical investigation by Herr Weiss (*Archiv*, August, p. 665). Upon distillation the leaves yielded about 1 per cent. of a thin pale greenish-yellow dextrogyre oil, sp. gr. at 15° C. 0·8795, miscible in all proportions with absolute alcohol, ether and chloroform. About 75 per cent. of this oil consisted of a terpene, apparently identical with pinene; the remainder of an oxygenated constituent identical with cineol ($C_{10}H_{18}O$) and a mixture passing over between 220° and 280° C., which was not nearer examined. The leaves, after the separation of the oil, yielded about 15 per cent. of alcoholic extract, from which were separated (1) "chekenon," crystallizing in yellowish odourless and tasteless six-sided prisms, soluble in alcohol, ether, chloroform, benzol and acetic acid, and insoluble in water, the composition of which is represented by the formula $C_{40}H_{44}O_8$; (2) "chekenin," crystallizing in odourless and tasteless yellowish rhombic tables, freely soluble in hot alcohol and ether, and difficultly soluble in cold alcohol, acetic acid, benzol, petroleum ether and water, represented by the formula $C_{12}H_{11}O_3$; (3) "chekenetin," obtained in yellowish, almost olive-coloured crystals, represented by the formula $C_{11}H_7O_6 + H_2O$, and probably allied to quercetin; and (4) "cheken bitter," an amorphous substance, soluble in most solvents, to which the bitter taste of cheken leaves is attributed.

Adansonia Digitata.

An analysis of the fruit of the Baobab tree (*Adansonia digitata*) is published in *Nouveaux Remèdes* (Sept., p. 385), by Messrs. Heckel and Schlagdenhauffen. They find that the acidity of the pulp of the fruit is due to tartaric acid and tartrates, and that the fruit also contains tannin, gum and mucilage, and glucose, the free tartaric acid amounting to nearly 2 per cent., and the bitartrate of potassium to nearly 12 per cent. The seeds yielded 38 per cent. of fat and the shell of the fruit 5·25 per cent. of alkaline carbonates. The authors think that the pulp is rightly used by the natives as a remedy in dysentery; that the seeds, containing both fat and albuminous matters, might form a useful aliment; and that the alkali of the shell could be utilized in Africa for saponifying rancid palm oil.

Oil of Cajuput.

Oil of cajuput, which was the subject of a communication to the Bath Conference (see before, p. 235), has been dealt with recently also in two other papers which carry its history somewhat further. M. Voiry reports (*Journ. Pharm. Chim.*, August, p. 149) upon a sample of a beautiful green colour, having a slightly agreeable penetrating odour, a sp. gr. of 0·934, which is higher than that of any of Mr. West's specimens, and lævogyre. It was found to present considerable analogy to oil of *Eucalyptus Globulus*. When submitted to fractional distillation two-thirds of the oil passed over between 175° and 180° C., and proved to be cajuputol, identical with eucalyptol. Below that temperature were obtained butyric, valerianic and benzylic aldehydes, and a lævogyre terpene ($C_{10}H_{16}$) that formed a crystalline monohydrochlorate. After 180° the distillation was continued at a reduced pressure and there were separated small fractions of terpilenol ($C_{10}H_{18}O$, isomeric with borneol), acetate, butyrate and valerianate of terpilenol, and a hydrocarbon ($C_{15}H_{24}$) that appeared to approximate to one occurring in the oils of copaiba and cubebs. Professor Tichomirow (*Pharm. Zeit. f. Russl.*, Aug. 28, p. 548) has examined the oil spectroscopically, and has satisfied himself that the green colour of a sample of cajuput oil that had been demonstrated to be free from copper was due to the presence of chlorophyllan, or oxidized chlorophyll.

Essential Oil of Carrot.

The essential oil of the fruit of *Daucus Carota* has been examined by Herr Landsberg in the Pharmaceutical Institute of the University of Breslau (*Pharm. Post*, Sept. 23, p. 613). The oil is described as being pure yellow in colour, of an agreeable carrot-like odour and tasting acrid, sp. gr. at 20° C. 0·8829, lævogyre, free from sulphur or nitrogen, and acid in its reaction from the presence of free acetic acid. The two principal constituents were found to be a terpene belonging to Wallach's pinene group and an oxygenated body ($C_{10}H_{18}O$) standing in near relation to cineol (eucalyptol).

Physiological Action of Borneol.

Dr. R. Stockman has published in the *Journal of Physiology* an account of his experiments with Borneo camphor, Ngai camphor, and borneol prepared artificially from oil of turpentine. Borneo camphor is highly prized by the Chinese as a stimulant, and the investigation was undertaken with the view of determining whether the exaggerated value set upon Borneo camphor by the Chinese is to be accounted for by any marked difference in action as compared with laurel camphor, or whether its high price is simply due to a superstitious belief in its supposed virtues and to its comparative scarcity. The results of the experiments show that the action of borneol, whether in the form of Ngai camphor, Borneo camphor or artificial borneol, is exactly similar to that of laurel camphor, although the latter is somewhat more poisonous than the other two, at least so far as the heart is concerned; this difference, however, might possibly be due to the presence of some slight impurity. Dr. Stockman points out that laurel camphor, borneol and menthol form a group of substances very closely allied to each other in physiological action, borneol resembling very nearly monobromide of camphor in this respect. All are closely related to the alcohol group in their physiological effect, menthol approaching the latter most nearly, but as the number of hydrogen atoms diminishes there is an increased tendency to convulsions of cerebral origin. Borneol and menthol, however, differ from pure ethylic alcohol in powerfully dilating the peripheral vessels. Borneol is also a less irritating substance locally than laurel camphor, and can be given in much larger doses than the latter without causing untoward cerebral symptoms.

Para- and Meta-phenylene-diamine.

In a note on the physiological action of para- and metaphenylenediamine, by Messrs. Dubois and Vignon (*Compt. Rend.*, cvii., p. 533), some very interesting and important facts are brought forward. These bodies have a remarkable similarity in their physiological action to leucomaines and ptomaines. In the dose of 0·1 gram per kilogram of the animal both these bodies cause in the dog salivation, vomiting, diarrhœa, abundant excretion of urine at intervals and death by coma, occurring in two or three hours when paraphenylenediamine is given, and in twelve or fifteen hours when metaphenylenediamine is administered. Besides this general effect, however, each of these bases present special peculiarities. Metaphenylenediamine causes in the dog all the symptoms of intense influenza. The animal appears to be seized with acute coryza and sneezes constantly; then follows a characteristic hoarse cough; finally, the ears and nose become hot and inflamed. The animal then becomes extremely depressed and indifferent to its surroundings, and ultimately dies in a comatose state. Paraphenylamine exerts a special action on the eye; it causes soon after a subcutaneous injection of it in any part of the body an extraordinary exophthalmia. The eye by degrees comes out of its orbit, the conjunctiva becoming pale and œdematous, and forming an enormous swelling, which almost hides the cornea. All the intraorbital cellular tissue becomes infiltrated and the lachrymal glands are blackened by a deposit of pigment. The metaphenylenediamine was obtained by means of the action of tin and hydrochloric acid on pure metadinitrobenzene, the tin being subsequently removed by hydrogen sulphide and the base taken up by ether, which on evaporation left the crude base; this was purified by distillation in a current of hydrogen and crystallization from benzene. The paraphenylenediamine was obtained in the same way from pure orthonitraniline.

Ethylene Chloride.

A curious effect has been observed by M. R. Dubois to follow the internal administration of ethylene chloride. It causes in the dog, in whatever way it may be given, a remarkable opacity of the cornea, which does not disappear for some months. This he now shows (*Compt. Rend.*, cvii., p. 488) to be due to a lymphatic infiltration of the cells of vitreous protoplasm, and especially to a swelling of the conjunctival tissue of the cornea.

Chloride of Ammonium in Neuralgia.

Attention is directed in the *Medical Press and Circular* (Sept. 19, p. 255) to a remedy for neuralgia that in the words of Dr. W. T. Greene is a very simple, most valuable, and strangely neglected drug, viz., chloride of ammonium, which he says he has never known to fail in the treatment of neuralgia. The dose given is 20 grains.

Cascara Sagrada.

Referring to the unsightly mixture produced when water is added to the official liquid extract of cascara sagrada, Dr. Irving says that this may be entirely obviated by the addition of a very small quantity of ammonia solution, which clears it to a bright ruby colour seen by transmitted light, the transparency of which is not affected by the addition of a flavouring agent such as tincture of orange or by saccharin (*Brit. Med. Journ.*, Sept. 22, p. 691). It can then be dispensed clear with iron preparations, such as citrate of iron and ammonium, a combination which Dr. Irving says he has found serviceable, with or without small doses of digitalis, where the heart is enfeebled and constipation exists. Mr. Martin also reports (*Lancet*, Sept. 1, p. 420) that he has succeeded in subduing the pain of rheumatism after sodium salicylate had failed, by administering cascara sagrada in combination with that salt, the proportions being 15 grains of the salicylate with 10 minims of the liquid extract in orange flower water every three or four hours.

Naphthol-Camphor.

The use of a mixture of β-naphthol and camphor is suggested by M. Desesquelle (*Archives de Pharm.*, Sept., p. 385), as probably preferable in some cases to a mixture of carbolic acid and camphor, on the ground that naphthol is a more powerful antiseptic and less poisonous than carbolic acid. As in the case of several other compounds, when finely powdered β-naphthol is mixed with twice its weight of camphor a colourless syrupy liquid is formed, which is insoluble in water, but soluble in all proportions in fixed oils. In this respect α-naphthol is said to behave exactly similarly to β-naphthol.

Impure Iodoform.

In the Pharmacy section of the meeting of Naturalists and Physicians at Cologne, Herr Neuss called attention to certain kinds of iodoform which are supplied in commerce as pure, and which answer to the tests in the Pharmacopœa Germanica, but which give a dark coloured ethereal solution due to separation of iodine (*Pharm. Zeit.*, Sept. 22, p. 565). He said that when an ethereal

solution of such a sample of iodoform is used in the manufacture of iodoform gauze, the gauze acquires a greenish colour, probably through the formation of starch iodide, and that persons employed in the preparation of the gauze suffer from the caustic action of the compound, which causes eczema. Some brands of iodoform, however, do not manifest this behaviour towards ether, which is attributed to the presence of an impurity not hitherto recognized. In the discussion, the statements in the communication were confirmed by Professor Schmidt, who said that the impurity in question was present in a high degree in an iodoform of German manufacture sent out as absolutely pure.

Morphine and Bitter Almond Water.

At the same meeting Herr Neuss reported the observation that solutions of morphine in bitter almond water sometimes show a separation of a yellow crystalline body. Recently he has ascertained that this separation takes place under the influence of light and that the crystals consist of oxydimorphine. He therefore recommends that such solutions should be kept sheltered from the light and dispensed in yellow bottles. It may be added that this reaction has been the subject of several communications in the German and Austrian pharmaceutical journals. It was at first attributed to the formation of an insoluble hydrocyanide of morphine, the incorrectness of which was pointed out by Professor Flückiger.

Reaction of Antipyrin.

M. Yacoubian, a Smyrna pharmacist, publishes a note on the influence of the presence of ether in a solution of antipyrin (*Journ. Pharm. Chim.*, Aug. 15, p. 152). Upon adding a few drops of nitric acid, and especially sulphuric acid, to a small quantity of an alcoholic solution of antipyrin a lively reaction takes place with a red coloration, and upon pouring in immediately a few drops of distilled water a green precipitate is formed that is not soluble in water. But M. Yacoubian says that if an ether and alcohol solution of antipyrin be used the reaction is not manifested until after the evaporation of the ether.

Cotton-seed Oil in Lard.

The adulteration of lard with cotton-seed oil, which appears to be carried out now on an enormous scale in the United States, has been the subject of several communications published during the past month. Besides the paper read before the British Pharmaceutical Conference by Mr. Conroy (see before, p. 237), no less than five others, read previously before the Society of Public Analysts, appear in the September number of the *Analyst*. Mr. A. H. Allen, like Mr. Conroy, thinks Milliau's modification of Bechi's nitrate of silver test valuable as a qualitative test, and possibly for obtaining rough quantitative results. At present however he thinks a satisfactory quantitative determination can only be made where cotton-seed oil is the sole adulterant, the higher iodine absorption number and slightly greater density of cotton-seed oil being the criteria then depended upon. But the introduction of beef stearin, a residue from the oleomargarin manufacture, affects that test, in consequence of its low iodine number, and leaves only the difference in specific gravity to judge by, beef stearin practically corresponding to lard in this respect. Mr. Allen also points out that the iodine number of lard oil is higher than that of lard. Mr. Hehner prefers Bechi's test to Milliau's modification of it; but for a quantitative determination he utilizes Maumené's reaction, the rise of temperature upon the addition of sulphuric acid being much greater with cotton seed oil than with lard. In doubtful cases he tests for physosterin, a substance occurring in vegetable fats as cholesterin does in animal fats, but differing from cholesterin in its crystalline shape of long needles, and by giving in a chloroform solution a bluish instead of a red coloration upon the addition of sulphuric acid. Mr. Rowland Williams, on the other hand, says he has failed to obtain satisfactory results with Maumené's reaction, and prefers to trust to the iodine absorption, since although it is interfered with by the presence of beef stearin, he has rarely found this to take place to the extent of altogether nullifying the test. In using Milliau's test qualitatively he advises the making of a blank test, as he has found even "pure" alcohol occasionally to contain impurities which reduce silver nitrate to some extent. Mr. E. W. F. Jones uses as a qualitative test the behaviour of the fat towards a mixture of chloride of sulphur and bisulphide of carbon, pure lard only thickening, whilst lard containing cotton seed-oil becomes solid. As a quantitative test he relies upon the iodine absorption. Mr. Stock uses the silver nitrate test quantitatively by comparing colorimetrically with mixtures of known composition. In the course of the discussion on these papers, Mr. Fox stated that he had recently met with a sample of lard containing 50 per cent. of earth nut oil, which he detected through the altered specific gravity and the presence of arachidic acid.

Embalming.

An interesting account of the most modern methods of embalming is given in the *Asclepiad* by Dr. B. W. Richardson, and formulæ for the solutions used for the purpose accompany the instructions given. The materials consist chiefly of aqueous or spirituous solutions of chloride of zinc, with the addition of the official hydrochloric solution of arsenic, chloroform, benzoic acid, etc., according to the different modes of procedure adopted.

Coloration of Flame by Elements.

Herr Cracau points out as a point probably worthy of further investigation (*Der Pharmaceut*, Sept. 15, p. 116) that certain elements resembling each other in chemical properties impart colours to flame that are complementary. For instance, potassium and sodium resemble one another in chemical properties and the former imparts to flame a violet and the latter a yellow colour, the two colours being complementary; barium and strontium also resemble each other chemically and the one colours flame green and the other red; and a similar remark applies to zinc and cadmium. Herr Cracau also thinks it suggestive that the colorations produced by potassium and calcium, both of which lie under suspicion as to their true elementary character, are of a compound character, the one being violet, a combination of blue and red, and the other orange, a combination of red and yellow.

Seeds of Camellia oleifera.

Mr. W. E. Crow, Government analyst to the Civil Hospital at Hongkong, in a recent report affords some interesting information concerning the poisonous properties of the seeds of *Camellia oleifera*. Some men were seen putting the powdered seed, known as Cha' tsai ping, into a live fish tank in one of the city markets, with the result that the

fish died almost immediately. Analysis, however, did not enable him to extract the active principle, which he supposes to be saponin, said to exist in the seeds to the extent of 10 per cent. (*Pharm. Journ.* [3], xiv., p. 21). Mr. Chas. Ford, Director of the Botanical Gardens at Hongkong, informed him that he had seen the Cha' tsai ping prepared in the Kwangtung province. It is merely the refuse matter left after the oil has been expressed from the seed. The shrub is extensively grown in southern China, and the seeds are collected in October or November, dried, crushed in a mortar, steamed and pressed. The pressed cake, which is met with in cakes of about 3 ounces and 3½ pounds respectively, besides being employed as a fish poison, is used by the Chinese as a hairwash, and as a soap both for cleansing the person and clothes. It is also used for the eradication of earth worms from the soil used for potting plants, and from grass lawns, the dilute decoction being poured on the grass. The smaller worms usually die, but the larger ones after a time recover. These worms, given to fowls and ducks, do not cause any inconvenience to the birds, while the fish killed by Cha' tsai ping are considered to be fit for human food by the Chinese, and there does not appear to be any record of such fish being injurious to human beings. These seeds were sent to the London market some time since under the name of Tanne seeds, and their acridity was pointed out in this Journal, but unfortunately their value for gardening purposes does not appear to have been mentioned to the consignee.

Mycorrhiza.

In a paper by Herr Schlicht (*Ber. Bot.-Gesellsch*, Sept., p. 269) a list is given of plants in which he has found mycorrhiza, which tends to show that this form of symbiosis is by no means peculiar to the Cupuliferæ, Leguminosæ, or Cruciferæ, or even to a few of the natural orders, he having detected it in no less than thirty-one natural orders. He remarks that the presence of the fungus has probably hitherto been overlooked, owing to its occurrence only in the more slender root fibres. He proposes to compare wild with cultivated plants, with a view of ascertaining how far its distribution is affected by cultivation.

Symbiosis of Alga and Sponge.

A very interesting case of what may be perhaps included under symbiosis is described by Messrs. Murray and Boodle in the *Annals of Botany* (p. 170). Under the name of *Spongodendron* and *Spongocladia*, two or three species of chlorospermous algæ have been described, which present a remarkable resemblance in outward contour and aspect to a digitate sponge. These have been examined carefully by the authors, who find that each alga is intimately mixed throughout its growth with a species of sponge bearing sponge-spicules. This growth does not appear to be accidental, since in each of the three species described a different species of sponge uniformly accompanies the alga, and the algæ are derived respectively from the Mauritius, New Guinea and New Caledonia.

Red Quebracho.

The wood of the red quebracho (*Loxopterygium Lorentzii*) appears to be coming into favour in Germany as a tanning material, the price being low in proportion to its tanning power (*Leather*, Sept., p. 49). An extract of the wood, resembling kino in appearance, is made in the Argentine Republic, but this does not appear to be exported to any extent.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 29, 1888.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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THE OPENING OF THE SESSION.

IN accordance with the customary practice, the first Evening Meeting of the Society for the coming session will be devoted to the two ceremonies accessory to the school courses, viz., the Distribution of Prizes to students of last year, and the delivery of an Inaugural Address to those who are about to enter upon their studies. The chair will be taken on that occasion at half past eight precisely, and the first business of the evening will be the distribution of the sessional prizes and certificates. Afterwards the address to the students will be delivered by Sir HENRY ROSCOE, and it may be expected that this part of the business will have a special interest, from the fact that Sir HENRY has taken a prominent and active part in relation to the Bill now before Parliament for the amendment of the Pharmacy Acts. As usual, all students and their friends, ladies as well as gentlemen, are invited to be present. In addition to these customary features of the October evening meeting of the Society, the meeting next Wednesday will be made the opportunity for presenting a portrait of Professor BENTLEY to the Society and a testimonial to himself. These proceedings will take place before the close of the meeting, and they will doubtless form a special inducement to be present, as being the formal expression of the high esteem in which the Professor is held by his former pupils, and by everyone connected with the Society.

The place of meeting on this occasion will be the Society's lecture theatre as hitherto, but the new examination hall will be open for the inspection of visitors, and refreshments will be served there after the conclusion of the meeting.

THE TEACHING OF CHEMISTRY IN SCHOOLS.

LAST week we drew attention to some of the obstacles, which are alluded to in the Report of the Committee appointed by the British Association, as hindering the effective teaching of chemistry. Turning now to other difficulties one of the most serious is stated to be the nature of the regulations of the various examining bodies, concerning which there is an almost unanimous chorus

of condemnation. It will be useful to quote two typical statements:—

"The influence exerted by external examiners on the character of the teaching. This has always been to me the most subversive of good teaching and most damaging to the character of the work. I have had a large experience in the working of the various public examinations, and I unhesitatingly say that they cripple the work of the teacher, afford no safe index as to the quality of the work, and lead to a system of book-work cram which militates against anything like mental discipline and against subsequent instruction in the higher branches of the subject."

"It will be seen that the examinations for which our pupils are prepared are those of the Cambridge Local, the College of Preceptors, and the Science and Art Department, and the preparation for each is so varied that it has a very bad influence."

The fact that a majority of the most experienced teachers agree in condemning the present methods of examination, and declare them to be subversive of sound teaching, is sufficient to show that a real grievance exists and that reform is urgently needed.

But over and above defects in the schedules of examination, teachers complain that sometimes examiners are appointed who have had little experience in teaching, and frequently no experience at all in teaching boys. "I do object," says a teacher of great repute, "to men examining boys under sixteen who have never taught them, and who therefore do not understand that the work of such students must differ, not only in quantity but also in quality, from that of older pupils." If the evils inseparable from examination are to be minimized, it is absolutely necessary to insist that examiners shall be selected from the ranks of teachers, and further, that the pupil's own teachers shall take some part in their examination. Any objection on the ground of undue partiality is met, and conclusively met, as the experience of the Universities has shown, by the association of "external" examiners with the teachers, in the work of examination. An ideal examining Board for public schools would be one on which the science masters of the schools were represented, as well as external teachers, chosen on account of eminence in their respective sciences. Since the Universities have now completely recognized this important principle, and appoint as examiners their own professors with "external" teachers of eminence, there can be little doubt that the establishment of a similarly constituted examining Board for public schools is in the very near future.

Inasmuch as the teaching in most schools is almost entirely regulated by the requirements of the various examining boards, it is not surprising to find that the present methods of chemical instruction are very inefficient instruments of education. Teachers complain that so large a proportion of time should be devoted to qualitative analysis to the exclusion of that which might be given to enforcing the general truths of the science. No doubt there is much to be said for qualitative analysis as a subject in which instruction can be conveniently given to large classes, and when properly taught and supplemented by a full discussion of the reactions that take place it may certainly be made to illustrate a variety of modes of chemical interaction. But it cannot be held to afford the mental training and logical discipline which other experiments are able to effect, under the guidance of a really skilful teacher. The truth is, that "testing" (as it ought to be called), mainly on account of the ease with which it can be taught and the facility with which it lends itself to the purposes of examination, has been allowed to usurp nearly the whole of the time which a boy gives to laboratory work. Many boys of intellectual promise, to whom physics are attractive, turn with repugnance from the monotony of a long course of "test tubing."

A word may be said here on the complaints that are so often made as to the absence of good text-books. No doubt exactly the right book for school-boys has yet to be written—in all probability by a schoolmaster. But it is to be feared that as a rule schoolmasters are apt, partly through no fault of their own, to abuse the function of a text-book; they are in fact obliged to use it as a substitute for verbal teaching. It is a situation of ease for a teacher to be able to put into the hands of his pupils a series of concise instructions for practical work, and to sit at his desk while they are being carried out. It is a situation, however, which ought not to be tolerated. What is required is personal contact of the boys with a teacher who is a master of his subject, with a mind trained to think exactly. Unless this can be achieved it is not to be expected that many boys will be "caught" by science.

In that part of the report which deals with method some powerful and suggestive remarks are quoted from the replies of teachers. Two may be cited here; the first puts in a nutshell the evils of a system of mere test-tubing; the second serves to show how a well-qualified teacher deals with the subject, one who is evidently fortunate enough not to be fettered by examinational requirements.

"Eternal analyses of simple salts and mixtures such as are required by examinations of the present day weary and worry the student, waste his valuable time, and throw away labour which in nearly every individual case would be most profitably spent in carefully studying and testing some important laws or principles of chemistry, and which would make the student's knowledge of the subject thorough and personal. Chemistry is essentially an experimental science. The great value of the study of the whole subject lies in the practical work done and in the method of building the theoretical structure on the practical knowledge. It is therefore absolutely necessary to have a thoroughly good laboratory with a lecture room attached, so that collective and individual work may be carried on with equal facility. At the present time, in our schools and colleges there is too much working for examinations,

and the requirements to pass such examinations are as narrow as paper legislation can make them. The student is for ever testing mixtures or performing some exceedingly simple gravimetric analyses. He is tied down, has his knowledge fettered instead of having it expanded, and never reaches the more advanced and useful principles of chemical science, which he can only dream of from the hearsay of his text book.

"It has always appeared desirable that a boy should approach chemistry in the same way that all the founders and builders-up of the science have done, viz., not by first reading a printed account of facts, and then verifying them or seeing them verified, but by studying the different forms of matter as substances hitherto unknown, the properties of which have to be investigated for the first time and compared with those of other substances. With this view the experiments shown are considered as questions put to Nature, the answers to which are as little known to the lecturers as to the learners. No predictions are made as to the results, although boys are not unfrequently asked what, arguing from experiments previously shown or the properties of analogous substances previously examined, may be expected to occur. *All* apparatus used is described; the reasons for any special arrangement of it being explained fully. Elaborate forms of apparatus, with a profusion of drying tubes, Woulf's bottles, fantastically bent leading-tubes are avoided as far as possible, their tendency being to draw off attention from the main point of the experiment. The arithmetical side of chemistry is not very much enlarged upon; it seems hardly desirable that boys should look upon experiments as pegs on which numerical problems are to be hung. Too much time may easily be spent in elaborate calculations on the quantity of zinc required to obtain enough hydrogen to decompose the nitrogen monoxide produced from ten grams of ammonium nitrate. Innumerable examples, however, illustrative of important laws, such as those of Gay-Lussac and Avogadro, and of calculations actually required in quantitative work, are frequently set generally at the beginning of each lecture, in reference to some point explained in the preceding one. No symbols, formulæ, or equations are used at first, not, in fact, until the properties of three or four elements, and of some of their compounds, have been studied and the laws of chemical combination deduced from them. Then, and not till then, it is thought that a learner can appreciate the value of Dalton's atomic theory in accounting for the facts he has observed, and can see the advantage of a system of chemical shorthand, and use it with intelligence and discrimination."

It seems worth while to reproduce here a statement, made by a schoolmaster as to the manner in which, in his opinion, the future teaching of chemistry in schools should be conducted.

"Looking at the enormous and ever-increasing number of important and interesting facts, has not the time come when chemistry should be taught to beginners as biology is taught? Instead of reading about hundreds of plants and animals, a student becomes practically acquainted with about a dozen of each at first hand. Why should not a similar plan be followed in chemistry? Why should not a thorough study of chlorine include all that an elementary pupil needs to know about the halogens? The principal member of each group of the non-metallic elements might be selected for special study. As to the metals half-a-dozen, which might be varied from year to year, if really mastered, would be much better than the knowledge which is required of them under the present system. Room would thus be found for a few organic compounds. It is pure pedantry to maintain any longer the arbitrary distinction of inorganic and organic chemistry in a first and general course. As to analysis, I think the present comparatively complete course should give place to a sound knowledge of the separation of some half-dozen substances, and the time thus saved could be devoted to easy exercises in quantitative analysis. There can be no doubt that quantitative analysis is within the reach of any student who can perform a good qualitative analysis. What I have proposed amounts to rewriting a syllabus for a first or general course of chemistry, on the basis of selecting a few typical substances and making a more or less complete study of them, and, with regard to analysis, to restrict the substances to be studied, but to require the elements of gravimetric and volumetric determinations."

The report of the Committee appears to lead to two conclusions. First, that some means must be found of bringing teachers together in order to come to an agreement as to the general lines on which school teaching shall be conducted, and secondly, that steps must be taken to secure the proper representation of chemistry in the school curriculum. There seems to be no reason why both these objects should not be attained by the further exertions of this Committee, and we are therefore glad to learn that the Committee has been reappointed, with the addition of Sir Henry Roscoe, whose experience and position alike ought to prove of much service to a cause which is so essentially bound up with the advancement of science.

TEACHING OF MATERIA MEDICA IN MEDICAL SCHOOLS.

An article on the study of materia medica, which appeared in the "Students' Number" of the *Lancet* on the 8th inst., contains some plain speaking upon the teaching of this subject in medical schools. The writer expresses the opinion that no other subject in the whole medical curriculum is regarded by students with the yawning aversion excited by this one. The cause for this distaste is attributed to the place which the subject occupies in the curriculum, and it is argued that the study should not be attempted before a firm foundation of physiology and chemistry has been laid. Many medical students, also, it is remarked, are apt to consider that they need not burden themselves with pharmaceutical processes, thinking that when they are in practice they will merely have to send to the nearest chemist for what they require, forgetting that the art of knowing what they want depends entirely upon their knowledge of materia medica. They think all details of infusions, decoctions, and the like can be ignored, until they are surprised by having a prescription returned owing to the incompatibility of the ingredients. Practical pharmacy at most medical examinations, it is added, is treated as though merely a matter of being "signed up," the work being frequently performed in a perfunctory manner, which leaves the haziest of notions around the reasons for the use of the various ingredients in a prescription, and paves the way for many subsequent difficulties with experienced dispensers.

British Pharmaceutical Conference.

TWENTY-FIFTH ANNUAL MEETING.
SECOND DAY'S PROCEEDINGS.

Wednesday, September 5.

(*Continued from page* 243.)

The following two papers were then read and discussed together:—

The Solubility of Citrate of Caffeine.

BY A. W. GERRARD, F.C.S.

A frequent demand for citrate of caffeine having arisen in my dispensing practice, it was deemed advisable to keep, if possible, a solution of the same ready made. Most dispensers are well aware of the advantages in time saving and cleanliness such solutions afford, and when they can be suitably concentrated and keep well there is no reasonable objection to their use.

Citrate of caffeine being an official drug, the British Pharmacopœia was consulted for information, where the following remarks on its solubility are to be found. "With a little water it forms a clear, syrupy solution, which on dilution yields a white precipitate of caffeine that redissolves when ten parts of water have been added." That is a very plain statement given on high authority, so that no difficulty was apprehended in supplying my want: it seemed that a 10 per cent. solution or even something stronger could be easily obtained. My first attempt to prepare the solution was a failure, but as the citrate of caffeine used might have been at fault five other samples were obtained, and one made by myself; none of these on testing responded to the official quoted solubility, neither dissolving in a little water to form a clear syrup, nor in the larger quantity to give a 10 per cent. solution.

Experiments made to obtain the true solubility of the drug showed that it would be useless to follow, in this case, the ordinary method for finding solubility; that is saturating distilled water at 15° C. with the salt, weighing a portion of the solution, evaporating, drying, and weighing the residue. The explanation of this is found in the fact that citrate of caffeine when added to water in excess of its solubility, is decomposed into caffeine and citric acid, therefore, a solution made by saturation could not be uniform, but must contain a large excess of citric acid.

Such being the case the method was adopted of weighing one part of the citrate in a stoppered, weighed flask, gradually adding distilled water at 15° C., frequently agitating until solution was complete; on reweighing and deducting weight of flask and citrate, the quantity of water used and solubility of the citrate was found. From eighteen experiments conducted on six samples of citrate a mean solubility of 1 in 29·8, or practically 1 in 30 was found. In each experiment when the point of saturation was nearly reached time of digestion was taken into account, three hours being allowed to elapse before further addition of water was made. The temperature at which the experiments were conducted fluctuated between 14° and 16° C.

The official statement that "citrate of caffeine with a little water forms a clear, syrupy solution," needs some notice. My attempts to get the solution have been failures. As "a little water" is a very elastic quantity may be I did not hit the mark correctly. With one-fourth, one-half, one, two, three, and four parts of water, no clear solution was obtained. What occurs on the addition of water is, nevertheless, interesting and peculiar. When three or four parts of water are added to one part of the citrate, it retains a fluid condition for a moment only, but never perfectly dissolves, it then quickly sets to a soft, pasty mass of crystals, thick enough to adhere to the containing vessel on inversion.

How the error pointed out found its way into the British Pharmacopœia, it is difficult to imagine, as the difference between a solubility of 1 in 10 and 1 in 30 is so wide. Books and journals have been referred to for information on the point, and the only additional statement found is in Squire's 'Companion to the British Pharmacopœia,' which after repeating the mistake of the B.P. adds in a bracket that "at 60° F. it is soluble 1 in 12." It is to be hoped that in future editions of the Pharmacopœia errors such as described will be avoided; they are no credit either to medicine or pharmacy. That the book which above all others the pharmacist uses as his guide should mislead him is superlatively bad. The remedy is easy. Pharmacy should be for the pharmacist; let those in whose hands the power rests generously give us a legitimate share in the compilation of the Pharmacopœia, and such mistakes as those on record will, I venture to say, be few indeed.

Citrate of Caffeine.

BY JOHN MOSS, F.I.C., F.C.S.

During August I received for the examination of its contents a small box, labelled "Citrate of Caffeine, Old P.B." It contained a mass of colourless, silky, inodorous acicular crystals, very unlike the white inodorous powder we know as citrate of caffeine. It was only slowly dissolved by many times its bulk of water and was quite neutral to litmus. In appearance it corresponded to caffeine, and on further examination not a trace of citric acid was discoverable. It was in fact pure caffeine.

I was informed that many sales of it had been made as "Citrate of Caffeine, Old P.B.," and have no doubt this was done in perfect good faith, but could obtain no explanation of the reference "Old P.B."

The important point to be emphasized is that if the above article is dispensed as citrate of caffeine a dose of caffeine will be exhibited as nearly as possible double that contained in the same weight of Caffeinæ Citras, B.P.

The President proposed a vote of thanks to the authors of these papers.

Dr. Thresh remarked that Mr. Gerrard seemed to have made use of these experiments as a peg on which to hang an indictment against the editors of the British Pharmacopœia, but he did not say whether a specimen made by himself carefully according to the directions in the Pharmacopœia yielded the same results. It would be strange indeed if the editors had fallen into such a gross error, and still more that it should have been perpetuated by Mr. Squire in his 'Companion,' because the editors evidently must have tried some experiments and found that their citrate of caffeine would dissolve in twelve parts of water. He had never had occasion to prepare the article, but he knew that commercial specimens did not correspond to the Pharmacopœia, and some would not dissolve even in thirty parts of water. He thought it was generally known that caffeine was frequently sold as citrate of caffeine, for some years ago when he had occasion more frequently to examine specimens of that kind, he found it was not at all uncommon to get so-called citrate of caffeine from a wholesale house, which when examined was found to be pure caffeine. Since he had been in Bath he had bought three different specimens, and found one to be pure caffeine and the other two basic citrates, which were not soluble in thirty parts of water.

Mr. Cripps said it would appear from Mr. Gerrard's paper that citrate of caffeine must be an exceedingly variable article. Some years ago he examined it for solubility and found it did not agree with the Pharmacopœia standard, but he did not find it differ from it to the extent Mr. Gerrard had stated, the sample he examined giving a solubility of 1 in 12. He adopted

the same plan as Mr. Gerrard, except that instead of giving it three hours for digestion he gave it three or four days.

Dr. PAUL said this was a substance of which it was very difficult to determine the solubility; neither the method of evaporating a solution nor ascertaining the quantity of water requisite to dissolve a weighed quantity would answer the purpose. It was very difficult to get caffeine into solution, and when it was dissolved, it was almost as difficult to get it to crystallize out, so that the determination of the solubility was very uncertain in its results. All the salts of caffeine were easily made, and might be got to crystallize from concentrated solutions, for instance the nitrate would form beautiful transparent crystals, but if one of those were dropped into a single drop of water it turned opaque, and on examination with the microscope it would be found that although the crystal retained its original form, it was made up of a mass of acicular crystals.

Mr. DOTT said a surgeon in Edinburgh desired a strong solution of this salt for hypodermic injection, and he tried all kinds of methods to prepare one, but without success, except a strong acid solution which was, of course, inadmissible.

Mr. A. C. ABRAHAM thought one important point had been overlooked; citrate of caffeine might under certain circumstances be made to dissolve in the proportion named in the Pharmacopœia. He was speaking "off the book," but some years since, being rather interested in this subject, he tried a good many experiments upon it, and made the citrate of caffeine himself both in smaller and larger quantities. He found that by making it in very small quantity, evaporating with very great care at a very low temperature, citrate could be produced which would dissolve perfectly in the proportions named, but within five minutes it entirely decomposed, and the caffeine crystallized out. At that time the question was raised whether there was any such thing as citrate of caffeine, and the experiment proved to his mind that there was, but that it was extremely unstable, and almost immediately decomposed. This would probably be found to be the key to the difference between the statements in the Pharmacopœia and the results obtained by Mr. Gerrard.

Mr. GROVES asked what was the reaction of the pasty mass Mr. Gerrard had shown as tested with litmus paper? If dissociation had taken place it would be acid. With reference to the preparation of a strong solution of caffeine for hypodermic purposes, it was shown some time ago that benzoate of ammonia or soda would dissolve almost any quantity, and that it would remain dissolved. Such a preparation, he believed, was largely used in France.

The PRESIDENT said the pasty mass produced in Mr. Gerrard's experiment was distinctly acid.

Mr. GERRARD said caffeine itself did not give an alkaline reaction with red litmus paper; therefore, if 1 grain only of citric acid were added to a considerable quantity of caffeine there was no neutralization of the acid.

Mr. HODGKIN produced a sample of caffeine which he said was interesting as being some of the first English caffeine made under the new Custom's regulations. This was the first step the authorities had been able to take in giving English manufacturers facilities for competing in articles like this with the Germans, but he hoped it would be followed by others, and that English chemical manufacturers would not be so severely handicapped in the future as they had been in the past.

Mr. MASON said there was one observation which ought to be made in dealing with a substance which was evidently very sensitive. The question was, what was water? The British Pharmacopœia said it was distilled water; the Bath water, he believed, had certain peculiarities, but Mr. Gerrard had simply taken water out of the bottle on the table to make his experiment. He supposed Mr. Dott had spoken of Edinburgh water.

Mr. DOTT said he used distilled water.

Mr. MASON said he remembered a great discussion at a meeting of pharmacists, on the question, what was water? But he presumed that for medicinal purposes it meant distilled water.

Dr. SYMES remarked that citrate of caffeine was always acid to begin with, and the fact of its being acid now was no proof that there had been dissociation. For hypodermic purposes either benzoate of ammonia or salicylate of soda enabled one to make a concentrated solution which was not objectionable.

Mr. MARTINDALE thought it was a great pity that citrate of caffeine was included in the Pharmacopœia. Caffeine was the preparation which was required, and if a salt was wanted the hydrobromate crystallized well, dissolved well, and did not decompose.

Mr. SCHACHT asked if Mr. Gerrard had investigated the nature of the deposit. It was suggested that either it was a basic salt of caffeine or pure caffeine, but it was just possible it might be a hydrate.

Mr. GERRARD, in reply, said the object of his paper was chiefly to point out the error of the solubility, and not to bring under the notice of the Conference any particular chemical decomposition. The subject, however, had naturally developed itself in that direction. In his experience he had never met with such a sample of citrate of caffeine as Mr. Moss spoke of in his note. He examined carefully all the purchased samples he used, titrated them with a decinormal solution of soda, and found they contained practically the proper percentage of caffeine and citric acid. It was a pleasant surprise to him to find that such was the case, for he did not expect to find that commercial citrate of caffeine was such a uniform product as it proved. In the citrate which he prepared himself he was careful to follow the process of the British Pharmacopœia, and his product gave the same results as the purchased specimens, and therefore he thought he had a right to come to the conclusion that it possessed the solubility he had mentioned. Mr. Cripps had thrown a little doubt on the solubility being as he had stated, and it was possible that specimens might be found having different solubilities; but he should like to ask Mr. Cripps if he examined his specimens to see that they were perfectly pure before testing them, and that they contained the proper percentage of acid and caffeine. He might perhaps have used water at a slightly different temperature, and that had a considerable influence on the solubility of citrate of caffeine. With water at 90° or 100° F. a large quantity could be dissolved. By using warm water a strong solution could be obtained, and he had experimented to see what strength could be made in that way so as to remain permanent for a reasonable time, and he found after cooling the strongest solution was 1 in 24, and that on setting it aside and subjecting it to the fluctuation of temperature which might occur between night and morning it underwent crystallization slightly on standing fourteen days. Dr. Paul had mentioned that neither of the methods he had named for testing the solubility of this substance would answer satisfactorily, and he should be glad to know of some better method, if possible. With regard to the administration of caffeine hypodermically both benzoate of sodium and benzoate of ammonium acted as powerful solvents, and so did salicylates, forming a double salt of caffeine, which was very soluble, and this was the best form available with which he was acquainted, where an injection of caffeine was required. Mr. Abraham thought citrate of caffeine could be made to dissolve in the proportion mentioned in the Pharmacopœia by very

careful working; he believed he had carried out his experiments very carefully, but nevertheless the results were as he had mentioned. The reaction of citrate of caffeine was always acid, because caffeine itself did not possess the alkaloidal character of turning red litmus paper blue. It was possible to get the citrate in definite crystals from a strong solution in warm water, but as Dr. Paul had mentioned, the moment it was touched with water it underwent decomposition and was split up into free acid and caffeine. With reference to the point raised by Mr. Schacht, he could not give any further information, but it was significant that whether in the dry state, made according to the official process, or in solution, if it were shaken up in chloroform, the chloroform would take out the caffeine and leave the citric acid, showing that it must be a very weak combination.

The next paper read was entitled—

A Few Laboratory Notes.

BY R. WRIGHT.

Pharmaceutical Chemist.

Several months ago, acting upon the suggestion of Dr. Thresh, I made experiments on the formulæ of several pharmaceutical preparations; and although possibly not of any great importance, it is thought that the publication of a few of these may prove of interest to pharmacists. The preparations to which attention will be called are acetum ipecacuanhæ, extractum cascaræ sagradæ liquidum (tasteless), syrupus ferri phosphatis, and unguentum hydrargyri oxidi flavi, and these will be taken in the above order.

Acetum Ipecacuanhæ.

For the production of this preparation, two processes suggested themselves, viz.: simple maceration of the drug in a diluted acetic acid, and a combination of the processes of maceration and percolation. In order to decide between the alternative processes, the following experiments were tried.

No. 1. One ounce of coarsely powdered ipecacuanha root was macerated with two fluid ounces of acetic acid, B.P., the mixture packed in a percolator, and sufficient water added to percolate 1 pint of liquid.

No. 2. One ounce of coarsely powdered ipecacuanha root was macerated for seven days in a mixture of 2 fluid ounces of acetic acid, B.P., and 18 ounces of water, with occasional agitation, the liquid strained, pressed, filtered, and made up to 1 pint with distilled water.

No. 3. One ounce of coarsely powdered ipecacuanha root was macerated with 1 fluid ounce of acetic acid, B.P., for twenty-four hours, the mixture packed in a percolator, and percolated first with a mixture of 1 fluid ounce acetic acid and 10 ounces distilled water, and afterwards with distilled water, until 1 pint of percolate had been obtained.

Process No. 1 was found to be unworkable. Percolation proceeded very tediously for two or three days and finally stopped altogether.

No. 2 gave a straw-coloured preparation, of which 1 pint yielded on evaporation 78 grains dry extract. Titrated with half strength Mayer's solution, 2 fluid ounces required 7·6 c.c. for complete precipitation of alkaloid.

No. 3 gave a darker coloured preparation, 1 pint of which yielded 99 grains dry extract on evaporation. Titrated with Mayer's re-agent, 2 fluid ounces required 8 c.c. for complete precipitation of alkaloid.

A combination of the two processes of maceration and percolation would therefore seem best adapted for the preparation of acetum ipecacuanha, and gives a preparation which leaves nothing to be desired.

Extractum Cascaræ Sagradæ Liquidum (Tasteless).

In the present uncertain state of our knowledge of the chemistry of the bark of *Rhamnus Purshiana*, it is impossible to say whether or not the bitter principle possesses laxative properties. Considering, however, that there exists in the same genus another species yielding a non-bitter bark possessing properties very similar to those possessed by cascara bark, it seems hardly likely, even if the bitter principle of the latter is found to possess laxative properties, that it will prove to be the only laxative principle existing in the bark.

The *Chemist and Druggist* for January 21, 1888, contained an extract from an article by F. Grazer, published in an American journal of pharmacy, and giving a formula for the production of a tasteless fluid extract of cascara.

This consisted in treating the coarsely-powdered bark with magnesia; and its subsequent extraction with dilute alcohol. I have made some experiments in the same direction, using both lime and magnesia. The former gives a pale-coloured fluid extract, and is apparently destitute of any laxative principle. With magnesia, however, using a modification of Grazer's process, I have obtained a preparation really free from bitterness, and which appears to act just as powerfully as the bitter extract.

The details of the process are as follows:—

Take of—

Cascara bark in No. 40 powder .	1 lb.
Calcined magnesia	2 ounces.
Distilled water	1½ pints.
Proof spirit	a sufficient quantity.

Mix the powders in a large mortar and beat into a thin paste with the water. Allow to stand for twelve hours, and dry over a water-bath.

Reduce the dry mass to powder, moisten with eighteen fluid ounces of proof spirit, and pack tightly in a series of six percolating tubes. Percolation is then effected with proof spirit, the percolate from No. 1 tube being used as the menstruum for No. 2, and so on until the last of the series is reached. The first 14 ounces which passes through the last tube is retained, and percolation continued until the bark is exhausted. From the remaining portion of the percolate the spirit is recovered by distillation, and the residue evaporated over a water-bath to the consistence of a syrup. This is added to the reserved portion, and the fluid extract made up to 16 fluid ounces with proof spirit.

Syrupus Ferri Phosphatis.

In the *Pharmaceutical Journal*, series 3, vol. xviii., p. 496, Mr. J. F. Brown, writing upon the above subject, called attention to the acidity of the B.P. syrup, and also pointed out that a syrup made in accordance with the instructions of the Extra Pharmacopœia would not contain as much free acid as the syrup of the B.P.

The subject was discussed in the Journal the following week by Mr. Martindale and myself, and it was pointed out that a far better syrup could be prepared than was obtainable by the B.P. process.

The essential features of that process are—

(1) The preparation of ferrous phosphate by precipitation.

(2) Its solution in excess of phosphoric acid.

(3) The addition of sugar and water so as to make the quantity up to a given volume.

The resulting syrup contains 10 fluid ounces of free phosphoric acid (66·3 per cent. strength) in 96 fluid ounces of syrup. Since the subject attracted attention I have made several experiments bearing principally upon two points. (1) The quantity of free acid necessary in order to form a stable and palatable syrup. (2) The influence of the excess of acid upon the keeping properties of the syrup. On December 12 last year I made four samples of syrup containing the following quantities of free acid.

No. 1.–10 fluid drachms in 12 ozs. syrup (B.P. strength).
„ 2.–8½ „ „ „ „
„ 3.–5 „ „ „ „
„ 4.–3½ „ „ „ „

Nos. 1 and 2 commenced to darken in colour a few days after being made, and ultimately every sample became slightly coloured, although the coloration in the sample containing the smallest proportion of acid is barely perceptible.

In No. 4, however, a slight deposit of phosphate has taken place, the supernatant syrup remaining clear.

It has been previously pointed out that the coloration which takes place is due to the action of the phosphoric acid upon the sugar, and the samples exhibited certainly seem to bear out the statement. It is doubtless also partly due to oxidation of the phosphate, for a highly coloured syrup will always be found to contain more ferric salt than one less highly coloured. Of the above syrups No. 1 was found to contain 6 times as much ferric salt as No. 4.

In drawing up a formula for this syrup, one other consideration has to be borne in mind, viz., the syrup should bear dilution with water without depositing any phosphate. Experiments were made with a view of ascertaining the amount of free acid requisite in order to prevent precipitation on dilution.

The following syrups were prepared:—

No. 1 containing 5 fl. drs. free acid in 12 ozs. syrup.
No. 2 „ 4 „ „ „
No. 3 „ 3½ „ „ „

Nos. 2 and 3 both gave a precipitate when diluted, whilst No. 1 remained clear.

Mr. Martindale has already pointed out (*Pharm. Journ.*, [3], vol. xviii., p. 912), that 1 fluid drachm of the B.P. syrup contains the equivalent of 41·7 minims acid. phosph. dil., and hence that it is perfectly unsuited for administration to children.

The following formula gives a stable preparation, and one which remains clear when diluted with water. It contains 20·8 minims dilute phosphoric acid in each fluid drachm:—

Take—

Iron wire, No. 35 (polished) .	360 grains.
Syrupy phosphoric acid, specific gravity 1·5	6 fluid ounces.
Distilled water	9 ounces.

Place in a glass flask, plug the neck with cotton wool, and heat till dissolved. Filter the solution into 72 fluid ounces of simple syrup and pour sufficient water over the filter to make the product measure 96 fluid ounces.

Unguentum Hydrargyri Oxidi Flavi.

The above is an article in frequent demand, and as there is no authoritative formula for it, I have made experiments with a view of ascertaining the best basis for such an ointment.

The B.P. formula for ung. hydrargyri oxidi rubri was tried, but it gave a dull unattractive preparation, and it was found impossible to get a smooth ointment, the hard paraffin separating out, however the process was varied.

A small proportion of beeswax was found to give sufficient firmness to the soft paraffin, and gives a smooth ointment of taking appearance.

Specimens are exhibited made from the following formulæ:—

(1) Take of—

Yellow oxide of mercury . . .	1 drachm.
Hard paraffin	¼ ounce.
Soft paraffin	¾ „

Melt together the hard and soft paraffin, pour into a warm mortar, add the oxide, and mix thoroughly, stirring until cold.

(2) Take of—

Yellow oxide of mercury . . .	1 drachm
Hard paraffin	1 „
Soft paraffin	7 drachms.

Mix as before.

(3) Take of—

Yellow oxide of mercury . . .	1 drachm.
Yellow wax	1 „
Soft paraffin	7 drachms.

Mix as No. 1.

(4) Take of—

Yellow oxide of mercury . . .	1 drachm.
Yellow wax	30 grains.
Soft paraffin	1 ounce.

Mix as No. 1.

Either No. 3 or No. 4 gives a satisfactory ointment; the latter, however, is rather too soft for use during hot weather.

The PRESIDENT having moved a vote of thanks to the author,

Mr. MARTINDALE, referring to the note on syrup of phosphate of iron, said it was quite true, as pointed out, that he had made an error in transferring the formula from the B.P. for making the solution of iron wire in phosphoric acid—the ingredients not yielding a sufficient supply of phosphoric acid to make the equivalent of the B.P. strength of acidity. In the 1885 B.P. the diluted phosphoric acid was converted into syrupy phosphoric acid, and he had overlooked the fact that that made an alteration in the strength of acid in the syrup. With regard to the amount of acidity present, the present B.P. strength was exceedingly acid, and this excess of acidity caused discoloration much greater than took place if a more dilute acid were used. He had kept some samples as the result of experiments conducted about the same time as Mr. Wright's. The B.P. 1867 process yielded a preparation which was fairly successful, kept well, and had about one-fifth less acid than the present, but it was doubtful whether it would be well to use so weak a strength as Mr. Wright, viz., using 5 ounces instead of 8½. If the acidity were reduced so much, the preparation was apt to throw out more of the ferric salt on keeping. It undoubtedly kept better in colour, but the ferrous phosphate would not be held in solution so permanently as if the 1867 strength of acidity were adhered to.

Dr. THRESH observed that it was not 5 fluid ounces, but 6 ounces, which Mr. Wright recommended.

Mr. GROVES said some years ago he made experiments on the coloration of syrup of phosphate of iron, and the result arrived at was that it was a kind of caramel which was formed, and these experiments seemed to bear out that view, the stronger acid showing more coloration. It seemed to him that although out of the province of the pharmacist to say so, the acidity of the syrup was excessive; instead of 40 minims a drachm, he thought 25 would be amply sufficient to maintain the ferrous phosphate in solution. The deposit formed was not ferrous phosphate, but ferric, and if the solution of phosphate of iron were kept carefully closed from the access of air it would keep any length of time. It should be put in small bottles, tightly corked and sealed. These might be kept any length of time, and underwent no coloration or oxidation, and from time to time a small bottle could be opened and mixed with syrup when required.

Mr. PLOWMAN asked if Dr. Thresh could give any further particulars about the action of the extract of cascara which had little or no bitterness. Mr. Wright used the expression "no doubt," and in all probability he was right, but he should like to know on what ground he used that expression. There was such a thing as idiosyncrasy, and it would be interesting to know if he had tried this new preparation on himself solely, be-

cause he might be particularly susceptible, and the same sample of liquid extract might produce widely different effects on different persons. He would be glad to learn, therefore, if Mr. Wright had distributed this preparation amongst his friends, and asked them to supply him with notes as to its effects, because no evidence as to its efficiency would be of much value unless taken from a number of cases. With respect to its being an extract free from bitterness, he could not quite agree with that. A large amount of the rather nauseous bitterness present in the ordinary liquid extract was removed, and the result was not unpalatable, but could not be said to be quite free from bitterness.

Dr. SYMES remarked that Mr. Wright used double the quantity of magnesia recommended in the original formula, which was 1 oz. to the pint, and that might be more effectual in removing the bitterness. He had made some experiments in this direction, and was inclined to think that although the flavour was much better, and a great deal of the bitterness was removed, that some of the aperient action was also taken from it. There were some three or four resins in cascara to which the aperient property appeared to be due, and magnesia certainly seemed to remove some portion of one or more of those, and in doing so removed the bitterness. He knew of several persons who had taken a tasteless extract of cascara, and the general result was that when prepared in this manner it was not so efficient as the ordinary kind. He had also used lime, and was rather surprised at Mr. Wright's statement that lime destroyed the efficacy, while magnesia did not. His impression was that the use of milk of lime certainly removed as much of the aperient property as magnesia, but not more so. On the whole, the experience he had gained was that this preparation was less efficacious than the ordinary extract.

Mr. GERRARD said it would be interesting to hear whether Mr. Wright had examined the final result for magnesia salts.

Mr. A. C. ABRAHAM said he had tried this preparation, and had certain evidence of its activity, but it did not seem to possess quite the same properties as before it was treated with magnesia. It was a mistake he thought to suppose that magnesia removed something; it removed nothing. If fluid extract of cascara sagrada were treated with magnesia there would be no separation whatever. The effect seemed to be that the magnesia rendered some of these acid resins soluble, but at the same time altered somewhat their character and action. The preparation might be made much more tasteless than the sample shown and perfectly free from all bitterness if the process were so varied as to cause a thorough reaction between the magnesia and these acid resins.

Dr. SYMES said when he said the magnesia removed something, he meant to say that it was not to be found in the fluid extract. His impression was that instead of forming something soluble with the acid resin it formed an insoluble substance which was not dissolved out.

Mr. CONROY said unfortunately he had not heard the paper, but from what he had heard of the discussion as to the efficacy of the sweet essence of cascara, he might say that he made some shortly after the formula appeared, and gave samples to Dr. Adam, of Liverpool, who tried it on many patients; he (Mr. Conroy) had tried it himself, and had it tried by members of his own family. In his opinion it was quite as efficacious as the bitter extract. He quite agreed with the remarks of Mr. Abraham, that there was not anything removed; it was simply a question of neutralising some of the acid principles.

Mr. GREENISH said this was a very important question, and the sooner it was satisfactorily settled the better—whether the bitter principle could be removed from cascara without diminishing its purgative property. Very soon after the formula appeared in the *American Journal of Pharmacy* he instituted a series of experiments in his own laboratory, and made the preparation according to the method. He gave a person the usual dose of extract of cascara, and it acted powerfully; he then gave him half-an-ounce of the extract deprived of its bitter principle, and it did not act at all, although the dose was repeated two or three times. The liquid extract was made from the same sample of cascara, and the dose of the bitter extract when repeated always produced a purgative action, whilst that deprived of its bitter principle given in four times the quantity produced no action at all. He believed if given to the extent of an ounce at the time it would have been the same, for it was increased to 6 drachms. It was scarcely creditable to pharmacists to countenance a preparation when deprived of its active principle in the way mentioned.

Mr. RANSOM said he could confirm the statement of Mr. Conroy. He had prepared a fluid extract, but slightly modifying the process and using only the amount of magnesia there stated. He handed a sample to a local medical man who pronounced it to be equally efficient with that of the B.P.

Mr. SCHACHT said these questions of degree were rather difficult to determine, and he should be very sorry to say that no difference occurred in the efficacy of two preparations, one retaining the bitter principle, and the other being deprived of it; but he could positively assert from his own experience of the two that he could detect very little difference indeed, and he was quite certain that the process recommended for depriving it of the nauseous and bitter taste did not deprive it of its effect, not as a purgative but as a genuine aperient, the two words meaning something essentially different. The tasteless preparation was a genuine aperient.

Mr. MACEWAN said shortly after this paper was originally published by the American journal he got two friends to try the process, and both reported to him that, as described, the magnesia process thoroughly removed the taste from the bark and also all the aperient or purgative principles. In fact, one might drink 6 drachms, and one of his friends offercd him a 16 oz. bottle, and assured him he could take the whole of it at once. They were quite of opinion that the author had simply given the germ of the truth in the paper, and accordingly they slightly modified the process, and as soon as they got on the lines indicated in Mr. Wright's paper they succeeded in producing a preparation which did possess aperient properties. There was this difference between the tasteless and the ordinary bitter extract. He had taken the tasteless preparation on many occasions, and also all sorts of preparations of cascara, and what the tasteless preparation did not give was the initial purging which followed a dose of cascara; but in twenty-four hours the tasteless preparation began to exert the aperient tonic effect on the bowels, and that was being regarded by many physicians as the most important character of cascara. If the physician wished to prescribe a tasteless cascara for a purgative effect he would be disappointed, for, as Mr. Schacht had said, he would find the preparation was only a tonic aperient. He thought Mr. Wright had done exceedingly good service to pharmacy by publishing the actual method which would produce this tasteless preparation.

Mr. MARTINDALE agreed with Mr. Schacht that the preparation of cascara might be described as essentially a tonic laxative—it was hardly an aperient. American writers said they were quite under a mistake to use it as an aperient; that it should be given in small doses of 5 to 10 minims threc times a day, when it would produce a tonic laxative action, and would not act as an aperient, although no doubt if taken in a large dose it would have that effect. It was not re-

commended for that purpose, as it was likely to produce flatulence.

Mr. MARTIN said he could not give his own experience, or that of any of his friends, but his firm had great experience in manufacturing this tasteless extract, and he could confirm the opinion that it was active. It was not tasteless, for there was a considerable amount of taste to it, but the objectionable bitterness was removed, and he thought it was proved to be active by the increasing demand for it to the comparative neglect of the bitter extract.

Mr. RICHARDS said he had taken cascara sagrada on several occasions. The medical authorities said that the dose could be gradually diminished, but he had not found that to be the case, for he always had to increase it, and then the effect on the head was so bad he could not continue it. He found by using extract of cascara and adding one-half of glycerine he was able to continue it for some little time.

Mr. DOTT thought it would be interesting to know whether, as some previous speakers thought, the magnesia removed nothing. He thought probably it removed so much of the purgative principle that when it was completely tasteless there was no activity whatever.

Dr. THRESH said it was rather unfortunate that Mr. Wright was not present to reply to the various questions which had been raised. With reference to the syrup of phosphate of iron he had already pointed out that 6 ounces was recommended, and that with that quantity there was in each fluid drachm 21 minims of B.P. phosphoric acid, and his own impression was that was quite sufficient for keeping purposes, and sufficient for all medicinal purposes. With regard to the cascara sagrada the discrepancies of opinion as to its therapeutic principles were really marvellous, but it appeared to him that very probably this tasteless extract might, apart from the removal of the nauseous principle, prove to be really a better aperient or laxative than the disagreeable extract which was at present official. The nauseous principle they seemed to know nothing about, but he had not the slightest doubt that on being treated with magnesia it formed some insoluble compound. He had had considerable experience in examining drugs for their proximate principles, and did not think he ever came across one from the tincture or infusion of which you could not remove something by the action of alkalies, such as lime or magnesia. The quantity of acrid matter might be exceedingly small, but he had not the slightest doubt it was there, and that the magnesia did remove it. He was not acquainted with the experiments which Mr. Wright had performed, but he could vouch for the fact that Mr. Wright was not likely to make such a statement without sufficient ground, and the fact that Mr. Schacht and others were able to corroborate it rendered it tolerably certain that this fluid extract prepared as described really was efficacious, and one well worthy of being further investigated. Mr. MacEwan also had contributed very usefully to this discussion by the remark that the original process did not yield a satisfactory result, but he also asserted that a very slight modification of it gave a result which was almost everything that could be desired. Mr. Wright was an old apprentice of his, and it gratified him exceedingly to find that he was pursuing examinations of this character. These papers on really practical pharmacy were just the class of which many might be contributed by rising pharmacists if they would only give a little time and attention to the matter. They did not require a large amount of knowledge of chemistry or of any other science, but they were very useful and often elicited discussion which was still more valuable. He should like the Conference in coming years to have a large number of papers of this character, and hoped the younger members would bear it in mind.

Mr. BALKWILL asked leave to say one word on the subject of ung. hyd. ox. A little while ago, in dispensing an eye ointment with the yellow mercury, the doctor ordered spermaceti ointment, and was very much disturbed to find that it produced inflammation of the eye. The fact was that the benzoic acid in the spermaceti irritated, and made it quite unsuitable for the purpose.

The next communication read was a—

NOTE ON COMPOUND SYRUP OF HYPOPHOSPHITES.

BY W. INGLIS CLARK, D.SC., AND D. B. DOTT, F.R.S.E.

From their appearance, taste, and behaviour in general, we suspected that certain brands of the above preparation did not contain all that their labels represent, and we therefore submitted some of them to analysis. In the first place the quinine was estimated by rendering a weighed portion of the syrup alkaline, diluting, and agitating with three successive quantities of ether, which was evaporated and the residue dried at 110° C. It was wholly organic, gave the colour reactions of quinine, and was held to be that alkaloid. The method followed for the determination of the metals did not materially differ from that usually adopted. Ammonia in excess, ammonium chloride, and ammonium sulphide were added to a weighed quantity of the syrup, which had been previously largely diluted. If not well diluted, the precipitate does not settle and persistently passes through the filter. After addition of the sulphide the solution should be heated, in order to make sure that all the manganese is thrown down. This precipitate is dissolved in dilute hydrochloric acid, the solution boiled to drive off hydrosulphuric acid, and the iron peroxidized with chlorate of potassium. On cooling, the solution is neutralized with sodium carbonate, rendered faintly acid with acetic acid, acetate of soda added, and the solution heated to boiling. The precipitated ferric hydrate is collected in a filter, dried and ignited. It is well to test the ferric oxide for phosphate by fusing with alkaline carbonate; and for calcium by treatment with the least quantity of hydrochloric acid, evaporating nearly to dryness, and then adding dilute sulphuric acid and alcohol, whereby the calcium, if any be present, is precipitated as sulphate. The manganese was determined in the filtrate from the iron precipitate by addition of bromine, and digestion at 60°. The precipitate was simply dried and weighed in clasped watch-glasses as MnO_2. To the filtrate from the manganese precipitate, ammonia and oxalate of ammonia were added, to precipitate any calcium that might be present. The filtrate from the ammonium sulphide precipitate was then mixed with oxalate of ammonium, and allowed to stand twelve hours before collecting the precipitate. This is necessary, as the sugar in solution retards the precipitation. The oxalate of lime was strongly ignited and weighed as oxide. The filtrate from the last mentioned precipitate was evaporated, and the residue incinerated. It is hardly practicable to burn away the last portions of carbon, as they become imbedded in the fused mass of salts. This difficulty is easily overcome by treating the mass with water, and then igniting the washed and dried charcoal by itself. It is advisable to do this; as it is difficult to wash everything out of the charcoal. The watery solutions were evaporated, nitric acid added, the residue strongly ignited and weighed as pyrophosphate. The potassium was determined in the usual way with platinic chloride, and the remainder of the residue considered as sodium salt.

In order to make sure that the method followed was quite trustworthy, we also analysed a sample from our own laboratory, the composition of which sample was of course known to us. It is the sample marked A in the table given below. As the amounts found corres-

pond almost exactly with the amounts added the results stated in the table must be substantially correct. No foreign acid was detected in appreciable quantity, except sulphuric, the presence of which is easily accounted for from the method of double decomposition being used in preparing one or other of the hypophosphites, and also from the practice of adding sulphate of quinine instead of hypophosphite.

In the case of the sample D, for instance, this had evidently been done, as the percentage of hypophosphorus acid determined with mercuric chloride, was deficient just by the proportion required for the quinine.

Grains of Hypophosphites in 1 *Fluid Drachm of Syrup.*

	A.	B.	C.	D.
Quinine . . .	0·25	0·14	0·11	0·12
Iron	0·77	0·72	0·10	0·15
Manganese .	0·27	0·22	0·00	0·08
Calcium . . .	1·04	0·00	0·83	0·15
Potassium . .	1·00	0·68	1·48	0·29
Sodium . . .	1·53	1·45	1·54	0·29
Total salts . .	4·86	3·21	4·06	1·08

It will be observed that B is deficient in quinine and calcium, C in quinine, iron and manganese, and D in everything. Whence it is evident that our suspicions referred to before were well founded.

The PRESIDENT, in proposing a vote of thanks to the authors said this paper showed how necessary it was for pharmacists who did not make their own preparations to examine those they sold and see that they were what they were represented to be.

Mr. A. C. ABRAHAM asked what these syrups were represented to be.

Mr. DOTT said in all cases the hypophosphites supposed to be present were given on the labels, and in all except one case the amounts were stated, and they did not correspond with those found, neither the quantities nor the substances.

Dr. THRESH asked whether they were of English or foreign manufacture.

Mr. DOTT said they were all of British manufacture (three Scotch, and one English).

The next paper read was on—

ENGLISH DISTILLED OIL OF MENTHA ARVENSIS (JAPAN PEPPERMINT).

BY JOHN MOSS, F.I.C., F.C.S.

I have recently distilled 205 lbs. of green herb of *Mentha arvensis*, var. *piperascens* (see E. M. Holmes, *Pharm. Journ.*, [3], xiii., 381) grown partly in my garden, close to the Mitcham peppermint fields, and partly in a garden four miles further away. This is the plant which yields Japanese oil of peppermint. The original slips were kindly furnished by Mr. Thomas Christy about two years ago.

The yield was 4 ounces, being about $\frac{1}{8}$ of 1 per cent., somewhat less than half the yield obtained at Mitcham. Had the plants been allowed to remain till in full bloom in September, the yield would no doubt have been much greater, but having grown so luxuriantly as to be somewhat of a nuisance, they were collected August 14th, 1888, when they had attained a height of 3 feet, and distilled on the 16th.

The oil, after standing for a week, was brilliant and had a decided yellow colour. The specific gravity at 62° F. was ·9107.

When determining the boiling point a light shower of very minute bubbles began to ascend at 339° F.; at 342° the shower was closer and remained steady for a quarter of a minute; at 369° it was still denser and composed of larger bubbles and stayed quite half a minute; at 402° F., with the barometer at 30 in., there was a steady tropical rain of large bubbles, which continued for ten minutes, and the boiling point was deemed to be determined.

The specific gravity of the oil after determining the boiling point was found to be ·9117 at 62° F.

Other specimens of oil distilled in England from imported herb, which was of course dry, were different in appearance and physical properties from that distilled by myself. They were some months at least older. One labelled "non-rect." was distinctly green, and had a specific gravity of ·9167° at 62° F.; a second, labelled "rect." was pale in colour with a faint green tinge, and had a specific gravity of ·9098. They were fatter looking oils than mine, and no doubt owed their higher gravity and greater viscoscity to resinification by age.

The specific gravity of these three oils confirm Todd's generalization that pure oils fall between ·908 and ·917 (*Pharm. Journ.*, 446, 1886). Each of them is miscible with any proportion of rectified spirit. The odour of the oil from English-grown herb was much more powerful and penetrating, yet softer than that distilled from imported herbs.

None of the three oils gives any coloration when subjected to the test given in Todd's paper above referred to. It consists in adding one drop of oil to a mixture of 25 drops of alcohol with one drop of nitric acid 1·2. After a longer or shorter interval, sometimes a few hours, a permanent blue or bluish-green colour is developed if oil from *M. piperita* be used. The test is exceedingly delicate. It is unfortunate that we possess none equally definite for the cheap Japan oil, and can only, even after many experiments, estimate the proportion of the latter in a mixture by the weakened response of the true oil present.

The object of this note is to place on record certain characters of Japan oil of peppermint of undoubted genuineness.

Dr. THRESH said Mr. Holmes desired him to mention that he had two specimens which were interesting in connection with this paper, one was a specimen of *Mentha arvensis*, a variety to which Mr. Holmes had given the name *piperaseens*, which was like Chinese *Mentha arvensis*, though from what he noticed in Bentley and Trimen's work this only occurred as a weed in the mint gardens, and they were careful to eliminate it, as the oil derived from the leaf spoiled the odour of the peppermint. It was now used largely to make the oil from which most of the menthol found in commerce was prepared.

Mr. GROVES said Mr. Moss appeared not to have attempted the extraction of menthol from this oil. It would be interesting to put the bottle into ice and see whether menthol would crystallize out.

This experiment was tried, but no crystallization had occurred at the close of the meeting.

Mr. A. C. ABRAHAM said he understood the source of menthol was the Japanese oil, which might have very different properties from the product of the same plant grown in this country. The oil now shown seemed very similar to the Mitcham oil, and from the fact that the Japanese oil crystallized at ordinary temperatures, in many cases he should imagine this could contain nothing like the proportion of menthol that the Japanese oil did.

Dr. SYMES said at the present time there were large quantities of Japanese peppermint oil used for cheap confectionery. The oil as imported was refined, and during the process the menthol was separated. Consequently, although the oil came to this country with a good deal of menthol in it, and also a good deal of menthol came as such, still menthol was produced here from Japanese oil.

The next communication was a—

Note on Cephaëlis tomentosa.

BY FRANCIS RANSOM.

A specimen of the root with a portion of the attached stem of *Cephaëlis tomentosa* was recently handed to me for investigation by Mr. Holmes. It had been received from Trinidad, where it is stated to be used for the same purposes as ipecacuanha.

In appearance the root is totally unlike that of *Cephaëlis Ipecacuanha*, having no annulations, but being marked with shallow longitudinal striæ. A transverse section also exhibits an internal structure entirely different from that of ipecacuanha. The cortical portion is very thin, and the whole of the interior consists of very hard, greyish-white, woody tissue. The stem is characterized by having a dark grey inner bark, easily made apparent by scraping the exterior with a knife, and a very well-defined medulla.

Preliminary tests indicated the presence of starch and glucose in both root and stem. Traces of alkaloid were also detected, the root apparently containing the larger proportion. The fact that the plant is claimed to possess emetic properties, and that it is attributed to the same genus as ipecacuanha, made it desirable to ascertain whether emetine is present. For this purpose, fifteen grams of the root, in fine powder, were percolated in a continuous extraction apparatus with ammoniated chloroform, this solvent having previously been found to exhaust ipecacuanha of its alkaloid, 'Year-Book of Pharmacy,' 1887, p. 450. The percolate was slowly evaporated on a water-bath, leaving a brownish-coloured residue. This was dissolved as far as possible in very dilute sulphuric acid and the solution filtered. To the filtrate excess of ammonia was added, and the mixture agitated with chloroform. After separation, the chloroformic solution was allowed to evaporate spontaneously, leaving an amorphous residue weighing only ·016 gram. To ascertain whether this residue contained emetine, it was dissolved in a small quantity of water with the aid of a drop of dilute sulphuric acid, and the following tests were applied to the solution. Solutions of iodohydrargyrate of potassium (Mayer's reagent) and iodine in iodide of potassium, each gave immediate precipitates indicating the presence of some alkaloid.

Potassium iodide, in simple solution, produced a white precipitate similar to that obtained with concentrated solutions of emetine. A strong solution of mercuric chloride also gave the white precipitate characteristic of emetine. Platinum perchloride gave a slight yellow precipitate similar to that produced with various alkaloids. Probably the best confirmatory test for emetine is that dependent upon the comparative insolubility of its nitrate. A drop of a saturated solution of potassium nitrate applied to a few drops of the solution under examination produced a slight, but evident, precipitate.

To ascertain whether any marked physiological action were obtainable, 60 grains were taken internally; no effect was produced.

From these results it appears that emetine is present in the root of *Cephaëlis tomentosa*, but the percentage is too small to make it of any material value as a substitute for ipecacuanha.

A vote of thanks was passed to the author of this paper on the motion of the PRESIDENT.

The next paper read was entitled—

Notes upon Citrate of Iron and Quinine.

BY ROBERT H. DAVIES,

Chemist to Apothecaries' Hall.

Whilst examining recently some samples of citrate of iron and quinine it occurred to me that it would be well to carry the analysis somewhat further than the usual step of ascertaining the amount of alkaloid present. The Pharmacopœia merely indicates respecting the alkaloid derived from the scale preparation that "it is almost entirely soluble in a little pure ether and when burned leaves but a minute residue."

These statements are undoubtedly applicable to the alkaloid quinine (which should alone be present), but apply equally closely to amorphous alkaloid and quinidine, and, since the solubility need not be perfect "almost entirely soluble," and the exact volume of "a little pure ether" is not stated, considerable proportion of most cinchona alkaloids might accompany the quinine without detection by the test in question.

Upon consideration it appeared to me that the separation of the tartrates of quinine and cinchonidine promised the most practical step towards proving the nature of the alkaloids present. This process is the official one for testing the value of cinchona bark, the alkaloid from which should prove to contain at least half its weight of these two principles.

My intention was, after weighing the crystalline tartrates, to examine them in the polariscope, and in this way ascertain the relative proportion of quinine and cinchonidine. This step, however, I was only able to carry out on some of the samples examined; I have therefore omitted the results obtained, and trust to be able to record them in a completed form shortly.

The samples examined were twenty-one in all. One being made under my own observation specially as a standard, nine being obtained from the makers, three being obtained from the agents of foreign manufacturers, and eight from retail establishments by ordinary purchase.

The results of analysis are given in a tabular form. I will just draw attention to what seem to me to be the most important of them.

1*st. Total Alkaloidal Matter.*—This varied in the samples examined from 11·42 to 19 per cent., the average being 14·86. The Pharmacopœia gives 16 per cent. as the amount which should be obtained; I do not think it is practicable to get this quantity, using the proportion of ingredients that are directed to be employed.

Mr. F. W. Fletcher ably criticized the process, and arrived at this conclusion shortly after the publication of the present Pharmacopœia (*Pharm. Journ.*, [3], xvi., p. 263).

Of the nine samples from English makers three gave above 16 per cent., two between 15 and 16, two between 14 and 15, and two below 13 per cent. The special standard sample yielded 15·75 per cent. In two cases of English make a sample some years old was examined as well as one of recent make. The differences were considerable:—

Case 1.—*Old* (No. 2 on table) 16·2 per cent.
Case 1.—*New* (No. 3 on table) 15·3 per cent.
Case 2.—*Old* (No. 4 on table) 14·65 per cent.
Case 2.—*New* (No. 5 on table) 15·85 per cent.

If the difference in these two cases had been similar, *e.g.*, if the old had contained uniformly less alkaloid than the recently-made it might have been put down to deterioration through age, but as in one case the "new" contains less, and in the other more, than the older manufacture, some difference in the manufacture must have taken place, or in the quality of the alkaloid used.

The foreign manufactures analysed were found to be very poor in alkaloid in two cases, which were, it is probable, of the same make, 11·42 and 11·55 per cent. total alkaloid being yielded respectively, whilst the third yielded 13·48 per cent.

The samples obtained as retail purchases gave total alkaloid varying from 13·20 to 19 per cent., three being over 16, and three under 14 per cent.

The drying of this alkaloidal residue was conducted in all cases at the temperature of 100° C. in a water-oven. As Mr. Fletcher points out, there is no official

statement as to the temperature for drying, and to me this seemed the best temperature for the operation.

It is very likely that the residues so obtained were not absolutely anhydrous; they were repeatedly weighed and re-heated until the difference between two successive weighings was very small; but to bring about such a condition that no further loss of weight occurs on again exposing, requires, according to my experience, so many days in the water-oven, as to be, as a rule, impracticable.

I may be permitted to take from my note-book the results of two experiments on this subject, made some time ago.

(1) 1·3854 grams pure hydrate of quinine was dissolved in acid, precipitated by alkali, then treated with a mixture of chloroform and ether. The solution was evaporated over hot water, and when the residue was apparently dry the beaker was transferred to a water-oven and weighed after fifteen hours' exposure. It was then put back for varied periods and weighed occasionally until the weight was deemed constant. The times of exposure (after the first fifteen hours) and the loss in weight after each were as follows:—

1.	Period of	4½	hours—	loss 4·6	milligrams.
2.	,,	2½	,,	,, 2·5	,,
3.	,,	14	,,	,, 4·0	,,
4.	,,	8½	,,	,, 1·5	,,
5.	,,	12	,,	,, 2·5	,,
6.	,,	24	,,	,, 0·7	,,
	Total	65½	,,	15·8	,,

So that after a preliminary exposure of fifteen hours this residue, then weighing 1·3854 grams, lost 15·8 milligrams during sixty-five and a half hours, equal to 1·1 per cent.

(2) In this the amount of alkaloid was smaller, and the loss after the first fifteen hours, relatively greater.

1.	Period of	4½	hours—	loss 5·1	milligrams.
2.	,,	3	,,	,, 1·9	,,
3.	,,	14	,,	,, 1·5	,,
4.	,,	7	,,	,, 0·7	,,
5.	,,	12	,,	,, 1·2	,,
6.	,,	24	,,	,, 0·2	,,
	Total	64½	,,	Loss 10·6	,,

So that after preliminary exposure of fifteen hours, the residue, weighing then 0·3413 gram, lost 10·6 milligrams during the sixty-four and a half hours further exposure, equal to 3 per cent.

2nd. The Preparation of the Crystalline Tartrates.—The mode of operating was as follows:—Five or 10 grams of the scale preparation were dissolved in water, treated with excess of ammonia, and then shaken thoroughly in a separatory funnel with chloroform. After three treatments with chloroform the alkaloid was completely extracted. The mixed, filtered, chloroformic solutions were then treated with dilute nitric acid (about 2 per cent. true acid), and having ascertained that the acid is in excess, the mixture is thoroughly shaken and the two liquids separated after standing a few minutes. To the chloroform a fresh quantity of slightly acidulated water is added, and the process repeated until a drop of the acid liquid put on a glass plate gives hardly a perceptible turbidity with a solution of picric acid. The solution of acid nitrate, which need not measure more than 50 c.c. if 5 grams were taken originally, is treated with solution of soda added drop by drop in the cold as long as the precipitate disappears on stirring, then gently heated and exactly neutralized, the final reaction being very faintly acid rather than alkaline.

To this solution whilst hot about one-sixth its volume of saturated solution of sodium tartrate is added, and the mixture allowed to stand twelve hours, when the crystals are filtered off, washed slightly, and dried in the filter by aid of blotting paper and exposure to air. In the process for examining bark the Pharmacopœia directs these tartrates to be washed and dried, but once more without specifying any particular temperature for drying.

When dried in the air under 30° C. the tartrates retain water of crystallization, the quinine salt retaining one and the cinchonidine salt two molecules. This is the form in which they are dissolved for use in the polariscope.

The actual tartrates weighed from 5·4 to 18·33 per cent. of the scale preparation, the only cases where there was a very marked deficiency being the foreign makes.

The tartrates obtained from these were—nothing, 5·4 and 9·09 per cent. respectively. In these cases considerable quantities of amorphous alkaloid were found in the mother-liquors from which the tartrates had been obtained, whilst the precipitate obtained by adding alkali to the mother-liquor in the other cases was relatively very small.

A correction has been made for the amount of tartrate of quinine and cinchonidine dissolved in the mother-liquors and washings from the crystalline tartrates. In the second column of the table the percentage of tartrate actually weighed is given, and in the third the percentage corrected by the addition of that considered to be present in the mother-liquors, etc.

Results of Analysis of Citrate of Iron and Quinine.

Sample No.	Whence obtained.	Total alkaloid per cent.	Tartrates yielded per cent.	Tartrates corrected per cent.
1	home made	15·75	17·71	18·73
2	English maker	16·20	16·74	17·56
3	,,	15·30	16·68	17·66
4	,,	14·65	17·04	17·98
5	,,	15·85	17·31	18·37
6	,,	16·35	16·18	17·16
7	,,	12·95	13·86	14·88
8	,,	12·99	14·57	15·44
9	,,	14·55	14·02	15·02
10	,,	16·20	18·18	19·09
11	foreign make	11·55	none	none
12	,,	11·42	9·09	10·11
13	,,	13·48	5·40	6·51
14	retail purchase	15·53	15·05	16·49
15	,,	19·00	16·74	18·03
16	,,	18·45	16·49	17·75
17	,,	16·51	18·33	19·55
18	,,	13·80	15·48	16·53
19	,,	14·28	16·14	17·40
20	,,	13·20	15·45	16·60
21	,,	13·20	15·50	16·46

The amount of tartrate yielded by the special home-made preparation (corrected) was 18·73 per cent.; of the known English makes one gave more than this, viz., 19·09 per cent. Altogether six gave over 17 per cent., and the remaining three under 16, one being as low as 14·88 per cent.

So far as the results go, I think they point to the fact that English-made citrate of iron and quinine is at present an honestly-made article; on the other hand, the samples from abroad seem to show that the foreign manufacturer has not a very accurate idea of our requirements when he is asked for ferri et quininæ citras, B.P. It must be remembered that the number of foreign samples was very small.

The most important conclusion from my results I consider to be that the Pharmacopœia demand of 16 per cent. dry alkaloid is not to be realized by using the Pharmacopœia proportions. This result corroborates the statement of Mr. Fletcher previously alluded to.

I think it would be better to make the demand of 15 per cent., and to define the temperature at which the residue is to be dried. I should prefer 110° C. as enabling one to dry it in a reasonable time.

When, as in two cases of English make examined by me the proportion of total alkaloid comes down to below 13 per cent., I think it behoves the makers to see if there is not something wrong with the process of manufacture, for such a deficiency of the alkaloid that should be present is rather considerable.

I much regret that I am not at present able to give the composition of the tartrates. The alkaloid usually found associated with quinine in the sulphate is of course cinchonidine, and merely weighing the tartrates affords no clue to the amount of this present. I trust to complete this investigation shortly, and in the meantime hope that the figures furnished by this application of a well-known method in (as far as I know) a new direction may not be without their value.

I have much pleasure in acknowledging the valuable assistance rendered me by Mr. Thomas Hunter in this work.

The PRESIDENT having moved a vote of thanks to Mr. Davies,

Mr. CONROY said the Conference was much indebted to Mr. Davies for this paper, though there was not the same inducement now to use less quinine as there was formerly, quinine being so much cheaper. With reference to the statement that it was impossible to make it according to the Pharmacopœia instructions to contain 16 per cent., he thought that Mr. Davies was in error. He believed the 1885 Pharmacopœia had been altered, and the statement now was that it should yield 15 per cent. when tested according to that process.

Dr. THRESH said it was included in the table of corrections.

Mr. NAYLOR said it had been conceded that it should be 15 per cent.

Mr. CONROY said he had often made the citrate of iron and quinine, and although it was impossible to get 16 per cent he did get 15½, and the least 15·3. Within the last few months he had tested samples of several makers, and they were certainly up to the mark, and so that as far as his experience went English makers were really making the pharmaceutical preparation.

Mr. CRIPPS said with regard to the question of the 15 or 16 per cent, a letter appeared in the *Pharmaceutical Journal* from the editors of the B.P. after a discussion on the subject, in which they withdrew the 16 and allowed 15 per cent. No doubt this accounted for the change from 16·2 to 15·3 total alkaloids in the product of one of the English makers which Mr. Davies described. With regard to the temperature of drying he had found, with Mr. Davies, that it was far better to use a temperature of 105° to 110° C., for the residue took a very long time at a temperature of 100° to become perfectly dry, but in 2 or 2½ hours at a temperature approaching 110° the quinine was almost absolutely dry, and would not lose more than another milligram on perhaps half a gram of alkaloid.

Mr. DOTT remarked that Mr. Davies spoke of using alkali as a precipitant, but did not say which alkali was used in separating the quinine from the sulphate. The Pharmacopœia directed ammonia, but was it not better to use some other alkali in preparing citrate of iron and quinine. If ammonia were used did it not cause a greater loss of alkaloid than potash ?

Dr. THRESH said he should infer that Mr. Davies used the alkali directed by the Pharmacopœia. Otherwise he would have laid himself open to a serious charge.

Mr. CONROY thought it was quite immaterial what was the alkali, seeing that the alkaloid was washed out by the chloroform.

Mr. GERRARD differed a little from this opinion, because he had found in alkaloid extraction no alkali equalled ammonia as a precipitant for the final exhaustion of the alkaloid. Of course as a solvent both potash and soda had a powerful action on some alkaloids, and did bring about deposits, but in the case of ammonia the change which took place was the minimum quantity. Not so with potash and soda. Moreover, potash and soda had the property of holding in solution a portion of the alkaloid, which ammonia had not, and lastly, if excess of ammonia happened to be used it could be got rid of by simple exposure to the air, which was not the case with potash and soda.

This was followed by a note on—

THE MINIMUM SIZE OF PILLS.

BY WALTER ASTEN.

In the *Pharmaceutical Journal* for July 21, page 51 an editorial note occurs calling attention "to the desirability, in the interests of pharmacy, that British dispensers should unite in adopting a uniform weight for pills, the size of which, owing to the dose, is necessarily small, while the excipient is left to the discretion of the dispenser."

For example :—

(1) ℞. Atropinæ sulph. gr. $\frac{1}{5}$. Ft. pil. xx.

(2) ℞. Acid. arseniosi, gr. $\frac{1}{24}$. Ft. pil. j., and so on.

This is certainly a matter of considerable interest and importance for pharmacists to settle, and one might have expected, in reply to the invitation for the views and opinions of practical dispensers, that a valuable and satisfactory correspondence would have resulted. But this has not as yet been the case.

I have thought, therefore, that it would be quite *d propos* to introduce the subject to the Conference, whereby some expression of opinion might be gained.

Everyone has experienced the unpleasantness of having pills returned by patients who declare that something must be wrong, that they had been previously dispensed at Mr. So-and-So's, and were much larger or smaller, as the case may be; or it may happen that at the same establishment they had previously been sent out a different size, although I am happy to say that, nowadays, in most dispensing houses it is a rule for the dispenser who first compounds the pills to make a note of the excipient used and the quantity. It is very obvious, then, that it is most advantageous to have a recognized weight which shall be generally adopted, the only question remaining, what weight shall that be?

Now, from what I have been able to ascertain, and from my own personal experience, I have found the 1-grain size to be most usually observed.

And it may be easily understood, too, for in that handy book, which is to be found almost at all dispensing counters, Martindale's 'Extra Pharmacopœia,' instructions are so explicitly given, in referring to pills containing ingredients which weigh less than a grain, to use excipient q. s. to make each pill weigh 1 grain. Again, from a point of elegance, it cannot be called pharmacy to put into a pill a lot of unnecessary extraneous matter. The skilful dispenser, before commencing to make up a mass, always studies what will be the most suitable excipient to use, whereby he may secure a good workable mass, *without unnecessarily increasing its bulk.*

Mr. Ince in the Practical Pharmacy Class has adopted the plan of adding q. s. excipient to 2 grains.

The advantages I have heard urged in favour of the 2 grain size are twofold: (1) that they are not so difficult to swallow, (2) that they are more easily prepared.

With regard to the first of these, I am one of those who possess no sympathy with the belief that pills are difficult to swallow (providing, of course, they do not exceed 6 or 7 grains), or with patients who say they cannot swallow a pill this size or that size; hence to my mind it seems absurd to attempt to satisfy such notions. With the argument that they are more easily prepared I cannot agree, for in making small pills, one

is always obliged to make a softer mass, and therefore one which will roll quickly, the pills, owing to their smallness, retaining their rotundity.

If, however, a mass which is to be rolled into 2 grain pills be made as soft, these are not so likely to keep their shape; hence, with less excipient the dispenser secures a harder mass, and consequently one which will be more difficult to manipulate.

The PRESIDENT, in moving a vote of thanks to the author, said he believed his primary object was to obtain the opinion of members of the Conference on the question of the size of pills desirable when no definite size was ordered.

Mr. ROBINSON thought there were two or three safe rules which might be laid down. If the ingredient ordered would make a pill of proper consistence it was the duty of the dispenser to add nothing, but to make it the size ordered; but when it was the case of a strong medicine, such as aconite and arsenic, the question was open to much doubt. He had been in the habit of having large numbers of pills ordered of these ingredients by a medical man who hitherto thought a small pill an advantage, but who had now changed his opinion. He was not aware until lately that a 1-grain pill was more difficult to swallow than a 2-grain, though now he thoroughly believed it; he also thought it was more difficult to make, and there was more liability of it getting lost. He was quite aware that some pharmacists thought a 1-grain pill the proper size for a minimum, but in his opinion it was open to discussion. If the material approached $\frac{7}{8}$th of a grain it would be difficult to make the pill exactly 1 grain. Therefore it was difficult to lay down a hard and fast line. If $\frac{1}{10}$th or $\frac{1}{20}$th of a grain were ordered it would be enough to make it up to a 1-grain pill, but with $\frac{6}{8}$th or $\frac{7}{8}$th of a grain it would be more satisfactory to make a pill 2 grains.

Mr. GERRARD said he felt personally much indebted to Mr. Asten for bringing forward the matter, and also to Mr. Ince for initiating the discussion. There was one difficulty always in the way of the pill maker, and that was that substances of different specific gravity occupied different space. When dealing with subnitrate of bismuth and other substances of high specific gravity, one did not quite know how much inert matter to use to bring the pill up to a certain volume, and therefore for each particular substance he needed a series of experiments, and the question arose was it worth his while to conduct such experiments when he had to make a few pills? He thought it must be left very much to the individual dispenser's judgment, and he should add enough excipient to make the pill up to a certain volume as near as he could judge, which should be in the case of small quantities about the volume of an ordinary one grain pill, because the volume of a grain varied considerably with the specific gravity of the substance. He did not quite see if an individual had to swallow a pill that it could make much difference if it were 1 or 2 grains. If he carefully conducted the operation he ought to get down 1 grain as easily as 2; on the whole he was in favour of the 1 grain size for quantities less than a grain. There were many substances which had to be made into pill form containing 2 grains which occupied the volume of 5 grains, sulphate of quinine for example; in that case they should be made of as small volume as possible. He thought the object should be to make pills of a grain volume rather than of a grain weight.

Dr. SYMES said the difficulty pointed out in the paper was not an imaginary one, and it would be a good plan if the first dispenser were to mark on the prescription the weight of the pill, and then if it passed from one town to another, or from one house to another, there would not be the same difficulty. Where the weight of the ingredients was half a grain or under he thought one grain a very desirable weight, irrespective of size; although as Mr. Gerrard pointed out these things varied in specific gravity that would make no difference in the end, so long as they were all agreed that a total weight should exist. If the drying ingredients came to about 1 grain it would be wise to decide on a 2 grain pill. The difference in swallowing a 1 and 2 grain pill was very little. A medical man once asked him if he knew how to swallow a pill, which he thought he did, and replied, "Put it on the tongue." "Oh, no," was the remark, "you should put it under your tongue;" and if this plan were recommended to any one who had a difficulty in swallowing a pill it would be found that all difficulty was removed, and that it could be swallowed without even perceiving it with a drink of water.

Mr. MARTINDALE said in a paper which he read at Liverpool he first suggested that in cases of the kind referred to the weight of the pill should be brought up to the size of 1 grain. A discussion ensued in the Journal, and one writer from Manchester particularly supported the idea, and he was under the impression that the suggestion then made had been generally accepted, so that he was a little surprised to see Mr. Ince's letter in which he recommended a 2 grain size. His experience in London had been that where it was possible to make pills not larger than 1 grain that method was almost universally adopted. He found the difficulty particularly when he was an examiner taking the subject of dispensing, for on one occasion the candidates had pills containing $\frac{1}{60}$ of a grain of arsenic to make, and he remembered showing his colleagues the results as made by different candidates. One made very nice 1 grain pills, clean, free from colour and as white as little pearls; they were quite a work of art, and no doubt such a pill was much more readily swallowed than a larger one. Another candidate made them 3 grains each, dark coloured. From the expressions of opinion he had heard since Mr. Ince's letter had appeared he thought most agreed with him that one given size should be accepted, but at the same time he should like a further expression of opinion, and regretted that Mr. Ince was not present. The opinions of physicians, ladies and others who told him that they could not take a big pill was in favour of the small size. The difficulty arose in the first instance from the instructions given by the prescriber *fiat pilula parva*; when it contained say $\frac{1}{4}$ of a grain of morphia the question was how small should it be. It was better to give a suggestion that it should not be under any circumstances smaller than 1 grain, unless there were special instructions.

Mr. ATKINS said the value of this paper would consist in the expression of opinion it elicted from the Conference. So far as he gathered, the object was to elicit the opinion of the members with regard to the making of pills in which a very minute quantity of an active ingredient was employed, not so much the question which Mr. Gerrard had dealt with as to general excipients for larger pills. His own practice had been to follow the advice of Mr. Martindale and others, and to make the maximum result 1 grain. This was a question of importance not confined to themselves only, but affecting very seriously the judgment of the public on their work. It had occurred to him to have a box of pills brought back with the remark that they were different in size from those which had been obtained from another firm, and if the prescription had been made up before by some great London house the inference must necessarily be that the provincial firm was at fault. His own practice had been to make the ingredients, however minute, up to the maximum of 1 grain, and he would endorse Dr. Symes's suggestion that a note should be made by dispensers as to the maximum quantity of the pill. He

would also suggest that the prescription books should have another line ruled for marginal notes. His own books were full of notes which were absolutely essential, though on very minute points, so that if the dispenser happened to be away who first dispensed the prescription there was no difficulty in exactly repeating it. Some of these details might be small matters, but they might prove of some little importance in the judgment of the client on the work done.

Mr. TOWERZEY said he adopted very readily the suggestion of a previous speaker, that all pills, the ingredients of which were less than 1 grain, should be made up to 1 grain, and those a little above 1 grain should be made up to 2 grains. For a number of years, in swallowing a pill he had adopted the method of placing it under the tongue, and then he could swallow six grains as easily as one. Medical men sometimes ordered 5 or more grains in a pill, and then requested them to be made small. This was an age of pills which were beautiful in appearance, but they were not always active. He had recent experience of pills made so well that they were totally inert. The makers were taken to task for making them so small, and the prescriber expressed the opinion that efficiency should not be sacrificed for appearance. For his own part he was very suspicious of a pill remarkably well made; the coatings were often very beautiful, but rather insoluble. He thought if a great many of the ingredients were ordered in the form of wafers they would answer the purpose therapeutically a great deal better, but that was of course another question. Mr. Atkins's suggestion could easily be carried out, and it was the practice of his firm to enter in the prescription book in a marginal note the quantity of excipient used. It often occurred to him that it would be very useful to put these marginal notes on the prescription itself. The first dispenser should mark the size of the pill, and if a second or subsequent dispenser found he could make the pill well with a certain excipient this might also be recorded.

Mr. VIGIS said ever since he had been in business he had adopted what Mr. Atkins suggested, viz., a column in the prescription book for notes which were very useful, such, for instance, as the shape of the bottle, or whether it should be a bottle with divided marks, two tablespoonful or one, or whatever it might be. He recollected nearly the first experience he had with regard to pills when he came to Bath, and that was being rung up in the middle of the night with the message, "Please, sir, Mrs. So-and-So has sent up to know if these pills are made up properly;" the pills in question not having been made up by him, but by someone in the centre of the city. He had also been rung up and found two wretched pills ordered with six ingredients in them, and they had to be silvered, and he recollected on one occasion in making them up by some accident in silvering one fell on to the floor, and he could not find it until the next morning, when he discovered it on the sole of his boot. When the customers came in the next day to pay they were horrified at being charged 6*d*., because they could buy a dozen pills elsewhere for 1*d*. His plan was never to make a pill under two grains, and always to make a note in the book as to the exact weight, and every other particular.

Mr. MARTIN agreed with previous speakers that uniformity was most desirable. It was more easy to disarm suspicion by similarity of appearance than to allay suspicion when it had been once excited. Most dispensers who learnt dispensing in any of the large establishments in London would adopt the minimum of 1 grain for very active ingredients. With regard to swallowing pills he never tried the experiment of putting them under the tongue, but he had often heard Mr. Deane tell people who complained of the difficulty that they swallowed a bigger piece of pudding every day; it was a mere question of confidence, and the larger the pill the more easy it was to swallow. He thought 1 grain should be the minimum for extremely active ingredients, and other pills should be made up with the best excipient experience indicated. He could scarcely agree that it was desirable to mark prescriptions with the comments of the dispenser. A physician in London was in the habit of telling the dispenser to stamp the prescription on the back where there was plenty of room, for sometimes there were so many stamps on them they could hardly see the prescription, and if in addition to that there were all sorts of comments as to excipients, etc., it would be utterly illegible.

Mr. ATKINS said neither Dr. Symes nor himself suggested that the prescription should be covered with a series of hieroglyphics about excipients; all he suggested was that in some minute form, which would be almost invisible except to the trained eye of the pharmacist, the weight only should be marked. It might be an open question whether even that should be done.

Mr. MARTINDALE said having the weight would be of no value unless the excipient were also mentioned.

Mr. BAXTER said this subject was very interesting to provincial chemists. Prescriptions often came from London ordering one-eighth of a grain of binoxide of mercury, and directing the pills to be made as small as possible. The excipient which seemed fairly safe to use was the crumb of bread, and it could with that be made the size of half a grain. When he was in London with a doctor he learned many things, not only in the making, but the action of pills. Calomel pills were used a great deal, and in one case a person who took them died afterwards, and there was a *post-mortem* examination, and the calomel pill was found undissolved in the stomach. He agreed with Dr. Symes that some remark should be made with regard to the excipient used, and also with Mr. Atkins's suggestion as to the note in the prescription book, so as to guide them, but it was as necessary to point out the excipient as the size.

Mr. WILMOTT asked Mr. Martindale whether whatever the quantity of active ingredient he would make it up to a 1-grain pill; if so, there was this disadvantage, that they had one-fifth, one-tenth, one-fifteenth, one-twentieth, or one-twenty-fifth of a grain of arsenic all made up to the same size, and in the case of their getting mixed it would be impossible to tell one from the other, or in case of the covers of the boxes getting transposed, whereas if there was a little difference in size they could be detected immediately. He hardly thought it advisable to have a pill too small, because the patient would run the risk of supposing he had not taken the pill at all. He was rather inclined to agree with Mr. Gerrard that it was a question of volume rather than of weight.

Mr. MACEWAN said in Scotland the custom was to follow Mr. Martindale's injunction. It was most important that the first dispenser should make a note on the prescription, for the London firm who dispensed the prescription first always got the benefit of any doubt afterwards, and the provincial house, no matter what its reputation might be, was sure to be blamed if it was not done in exactly the same way. The Germans had settled all this difficulty by marking on the prescription what excipients were used, and the quantities, and they had no difficulty in the matter. If that rule were as rigidly followed in this country as it was in Germany, all these difficulties would vanish.

Mr. BIRD suggested that in order to define more accurately the size of a 1-grain pill a particular pill mass should be taken as a standard, because, of course, pills made of pill mass of different specific gravity would vary considerably in size, although made of the same weight.

Mr. MARTINDALE, in reply to Mr. Wilmott, said he had not found the difficulty suggested with regard to arsenic pills of different strengths, because he took care they should not get mixed. His suggestion not only applied to the size of the pill, but to the bulk, which should be made up of something, and sugar of milk was as inert as anything which could be suggested, and his suggestion in the 'Extra Pharmacopœia' was to this effect: "A 1-grain pill is much preferred to a 5-grain one; yet, unless specially ordered otherwise, when the ingredients prescribed for each pill weigh less than 1 grain, it is a rule with dispensers, for uniformity's sake, to triturate the ingredients with sugar of milk and glycerine of tragacanth q.s. to make each pill weigh 1 grain. These excipients, glycerine of tragacanth and sugar of milk, generally are as neutral as any that can be chosen." If such excipients as those he suggested were used, pills would always be readily soluble.

Mr. YOUNG asked if Mr. Martindale would go a little further and say if, when the ingredients exceeded 1 grain, he would use sugar of milk or glycerine and tragacanth to make it up to 2 grains?

Mr. MARTINDALE said, no; he made the limit one grain; if it exceeded that the dispenser's duty was to make them up as small as possible.

The PRESIDENT said he must now close the discussion, although no doubt there were other gentlemen who would like to express their opinions had time permitted.

(*To be concluded.*)

Parliamentary and Law Proceedings.

POISONING BY CARBOLIC ACID.

At the Wavertree Town Hall, on the body of William Smith, 50 years of age, a blacksmith, of High Street, Wavertree.

Jane Smith stated that the deceased was her husband. He came home on Monday afternoon about five o'clock, and called to witness, who was upstairs at the time, whether she had brought in his beer. She then heard him walking about, and on coming into the kitchen from the cellar he cried out, "Oh, dear me, I have made a mistake. I thought it was beer, and it has burned my lips." Witness saw there was something wrong, and sent for Dr. Harvey. He came in a few minutes, and afterwards Dr. Wilson arrived, but their efforts were useless, as her husband died about an hour and a half later. The bottle which usually contained her husband's beer was similar in appearance to the one which was half full of carbolic acid. The acid was obtained from the Local Board of Health for disinfecting purposes. There was no label on it when it was received from the Town Hall.

Mr. Mealing, Clerk to the Wavertree Local Board, said that there should have been a red label on the bottle when it was supplied, with the word "Poison" printed on it. The Board was under no legal obligation to do this, but it was done for safety. He could not say how it happened that the bottle was not labelled.

The jury returned a verdict of "Death from Misadventure."—*Liverpool Mercury.*

Obituary.

Notice has been received of the death of the following:

On the 19th of September, Mr. George Clement Fox, Chemist and Druggist, Old Charlton, Kent. Aged 41 years. Mr. Fox was an Associate in Business of the Pharmaceutical Society.

On the 20th of September, Mr. Frederick William Stone, Chemist and Druggist, Fore Street, Exeter. Aged 52 years. Mr. Stone had been a Member of the Pharmaceutical Society since 1875.

On the 22nd of September, Mr. John Brendon Newcombe, Chemist and Druggist, Okehampton. Aged 44.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

A VERMIN KILLER.

Sir,—It is a fact not so well known as I think it deserves to be that native sulphate of baryta is an active poison to rats, mice and dogs. It is not easy to explain its action, considering its extreme insolubility, but mixed with lard it is readily eaten by these vermin. This being the case, the question suggests itself, whether it might not replace the more dangerous poisons now so much used for this purpose, and do away with the risk attending them.

Bradford. F. M. RIMMINGTON.

TURPENTINE LINIMENT.

Sir,—The following note in regard to the above will, I think, be of considerable interest to many chemists to whom the varying consistence of this preparation from different establishments has caused a good deal of trouble.

From recent experiments I have made I have been able to obtain a preparation constant in character; being firm in consistence and presenting the appearance of a beautifully white, soft, plastic jelly. In making this preparation on former occasions, I found that the operation of rubbing down two ounces of soft soap in two ounces of distilled water was one of considerable difficulty, so as to get the result perfectly free from lumps.

Having had occasion to make some the other day I thought I would dissolve the soap in the water by the aid of heat, and having allowed it to cool finished the making in the usual way.

The product far excelled anything I had hitherto been able to produce, and the result of further experiments served only to verify the correctness of the first. From these results I am led to believe that were the directions of the B.P. amended so as to read "dissolve the soap in the water by the aid of a gentle heat, and having allowed the mixture to cool, etc.," the result in each case could not fail to be the production of a preparation uniform in consistence, elegant in appearance, and satisfactory in every respect.

Kensington, W. D. REID.

DETERMINATION OF MELTING POINTS.

Sir,—May I point out a source of error in the methods described by Mr. Symons for the determination of melting points? viz., that no correction is made for the cool mercury column of the thermometer. The melting point of stearic acid, so corrected, would be 69°·08. The error may be entirely prevented, however, by the use of a tube described by Piccard (*Berichte*, 1875, page 687), similar to that figured by Mr. Symons, but by the use of which it is possible to immerse the stem of the thermometer in the bath, and so avoid the correction for the cool mercury column.

THOMAS S. DYMOND.

"*Alpha.*"—The error pointed out unfortunately occurs in the original. We do not know that there is any agent for the supply of the journal in this country, but no doubt it could be obtained direct from the publishers, W. Wood and Co., Lafayette Place, New York.

W. J. S. Shepperd.—(1) *Pyrus Aria.* (2) *Verbascum Lychnitis.* (3) *Verbascum nigrum.* (4) *Sedum Telephium.* (5) *Sedum reflexum.* (6) *Odontites rubra.*

W. R. Selleck.—Apply to the Secretary for a copy of the pamphlet entitled "Hints to Students."

J. Morcombe.—The principal requirements for obtaining the qualification are evidence of a thorough knowledge of systematic chemistry and practical acquaintance with methods of analysis.

F. A. Brown.—Any method that would allow of the ether being distilled off so as to act again upon the matter contained in the fat would answer the purpose.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Symes, Hart, Thomas, Burroughs, Wellcome and Co., Mason, Kirkby.

MAW'S

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Hot Water, Infusions, &c.

FIG. 8.
MAW'S IMPROVED.

FIG. 6.
MAW'S DOUBLE-VALVED.

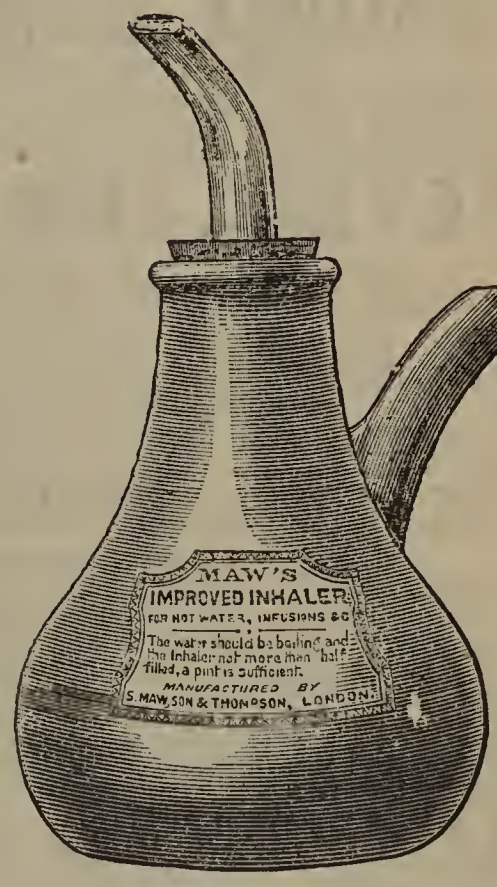

FIG. 8A.
MAW'S IMPROVED.

Fig. 6.—Double-Valved, 60s. per dozen; with Elastic Tubes, 78s.

Fig. 8.—Marbled, 32s. per dozen. Fig 8a.—White, 21s. per dozen.

Fig 8a.—White, half size, 13s. per dozen.

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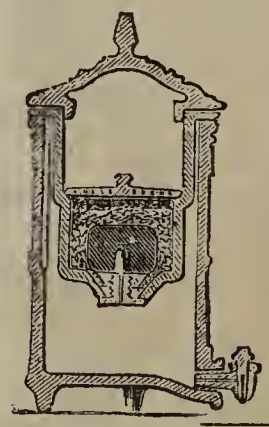

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British Medical Journal, March 13 and April 3, 1886.—"We find Messrs. Savory and Moore's Pellets, as might safely be inferred, possess the advantages claimed for them. They are very active and do not require a large excess of alkali, which we consider a feature of much importance, especially in infant feeding. The milk peptonised by the pellets is of very fine flavour."

The Lancet, June 5, 1886.—"The Peptonising Pellets issued by Messrs. Savory and Moore are excellent, and will be found useful for peptonising milk."

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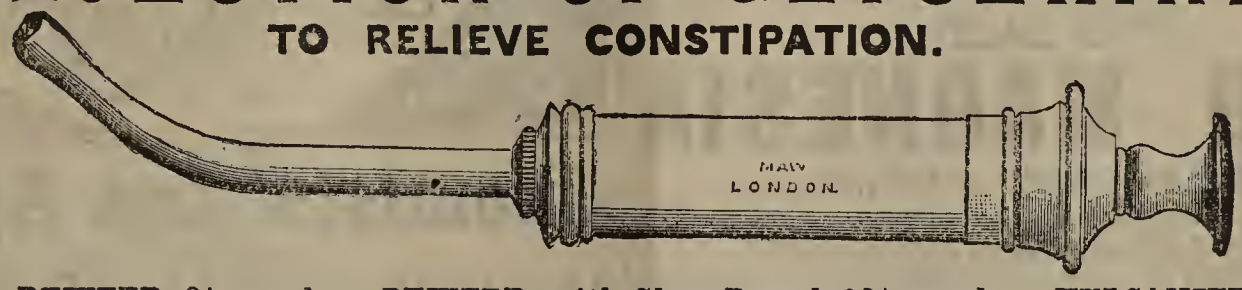

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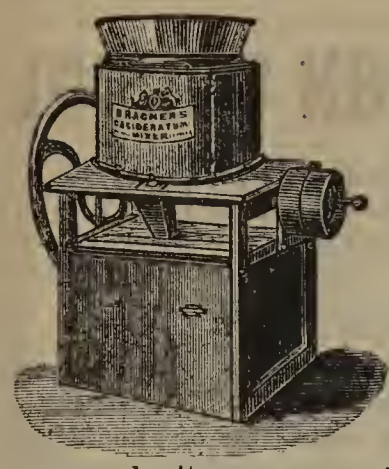

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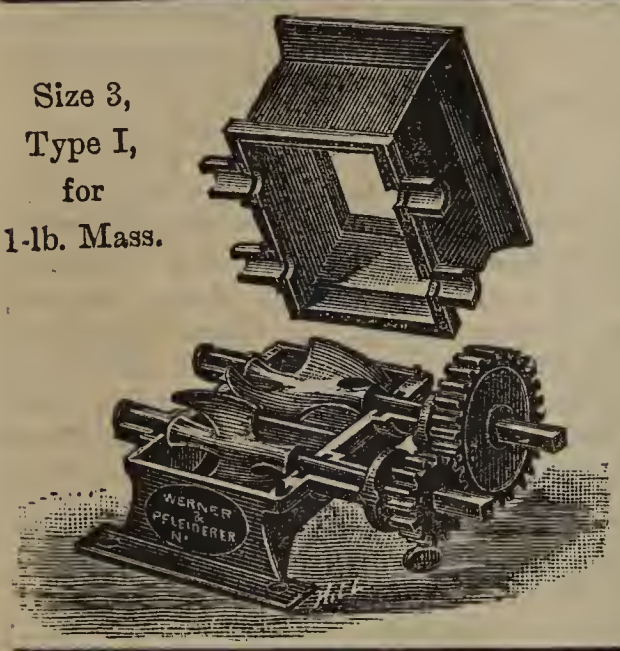

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Post Office Orders to be made payable to Messrs. WILLS & WOOTTON Trinity Square, London, S.E.

WESTMINSTER COLLEGE

The Lectures and Classes for the October and December Examinations have commenced.

The next two courses will commence on October 23rd and January 1st, entries for which can now be received.

Students can enter at any time, but are advised to commence their studies at the beginning of a course.

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During the past Session, **14** Students passed the Preliminary, **140** the Minor and **12** the Major Examinations of the Pharmaceutical Society.

At the last Pharmaceutical Examinations, **3** Major Candidates from this School presented themselves, **6** passed. The following **35** Minor Students were also successful.

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CARTER, B.	FORSTER, J. B.	WANT, W. P.
EVANS, J.	HEATON, S. W.	WRIGHT, J.

MINOR.

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BAKER, H. W.	HITCHMAN, W.	PATCHETT, J.
BELL, J. H.	HORSLEY, E. S.	PEPPERDINE, H.
BROOKS, J.	JONES, J.	REID, D.
BROWN, L.	JONES, LL.	RUTHERFORD, W.
DOUGLAS, J. W.	LANCE, W. D.	STARK, J.
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Are held every **Tuesday, Wednesday, Thursday** and **Friday**, from 7 till 9 p.m.

The Thursday Evening Classes extend over a term of SIX WEEKS, and are intended for those students who have previously failed in the examination, or who wish to present themselves at the next examination. The course consists of six hours practical chemistry and six lectures (of one hour's duration) on the most important points in each subject. Fee for the course, **10s. 6d.**; or **2s.** each night.

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For Minor Students are now held on Monday, Wednesday, and Friday evenings, from 7.30 to 9. Fee 1 guinea per month.

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 954.] SATURDAY, OCTOBER 6, 1888. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, November 14th, at half-past Seven.

The chair will be taken at Eight *precisely*.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, November 7th, as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society, of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of THREE ANNUITANTS on the Benevolent Fund of this Society will take place on Thursday, the 6th day of December next, at 12 o'clock precisely.

RICHARD BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 3rd, 1888.

There are at present *forty-nine* annuitants, receiving £1670 per annum, and casual relief is also granted, amounting in 1887 to nearly £500. The total expenditure in 1887 was £2375.

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Donations and Subscriptions are earnestly solicited.

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OF THE

Pharmaceutical Society of Great Britain.

The Forty-seventh Session commenced on Monday last, October 1st, 1888.

CHEMISTRY

BY PROFESSOR WYNDHAM DUNSTAN.

The Lectures commenced on Monday last, October 1st, at 9 a.m., and will be continued on the first three days of each week.

PRACTICAL CHEMISTRY

BY PROFESSOR ATTFIELD.

The Laboratories re-opened on Monday last, October 1st. Instruction in Practical Chemistry may be had daily throughout the Session, between 10 a.m. and 5 p.m. Entries may be made for various periods.

BOTANY

BY PROFESSOR GREEN.

The Lectures commenced on Friday last, October 5th, at 9 a.m., and will be continued on the last two days of each week.

MATERIA MEDICA.

Demonstrations will be given by Mr. E. M. Holmes, the Curator of the Museum, on Thursdays, at 9 a.m.

PHARMACY AND PRACTICAL PHARMACY.

Lectures and Demonstrations will be given every week by Mr. Joseph Ince, on Tuesdays, Thursdays and Fridays, at 5 p.m. Laboratory work in Practical Pharmacy will be carried on from 3 to 6 p.m. on Mondays and Wednesdays.

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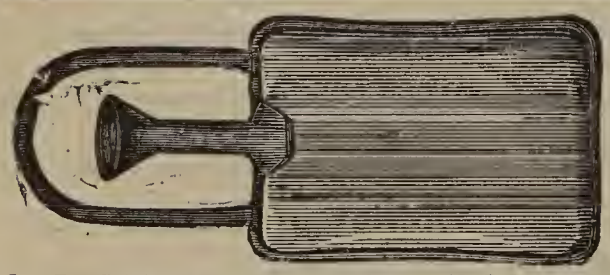

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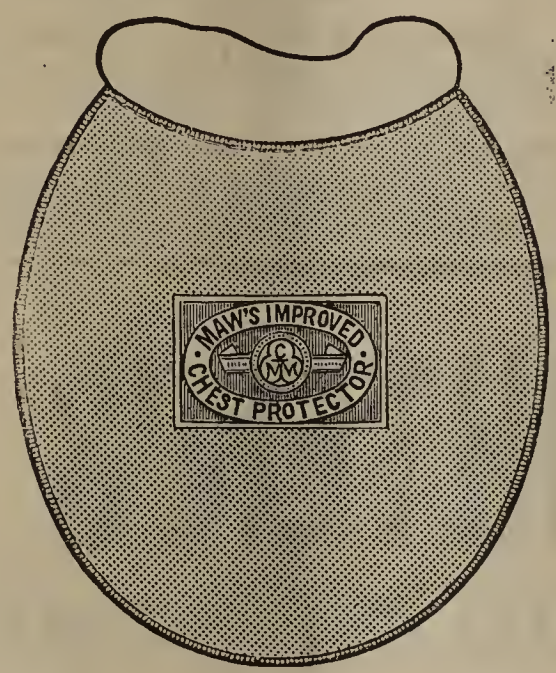

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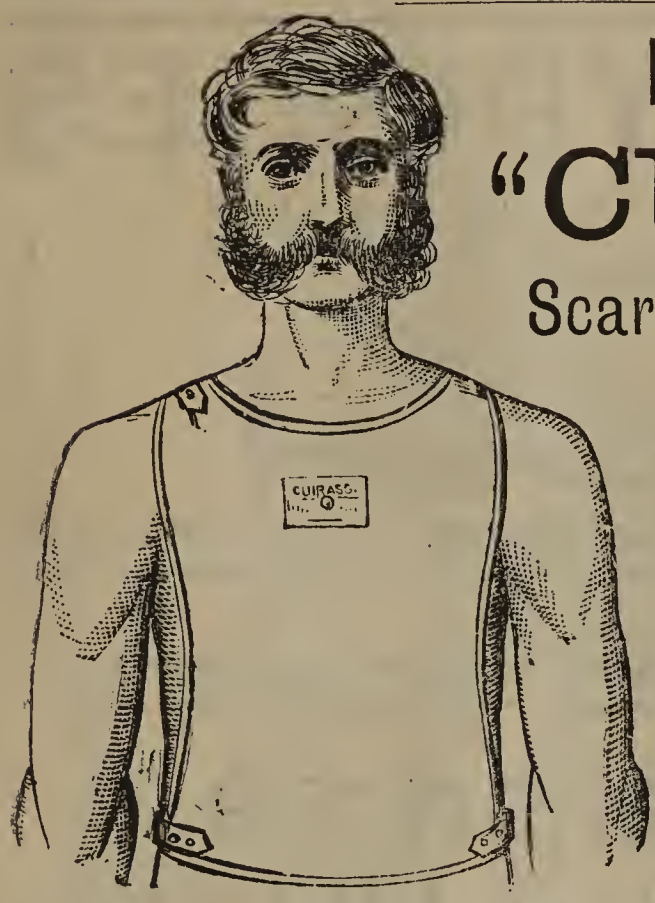

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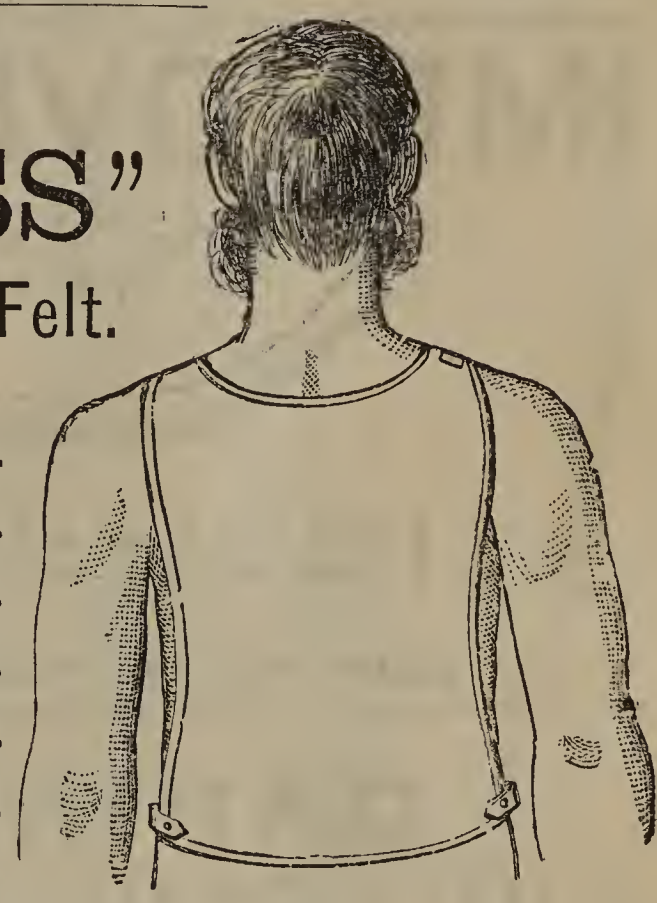

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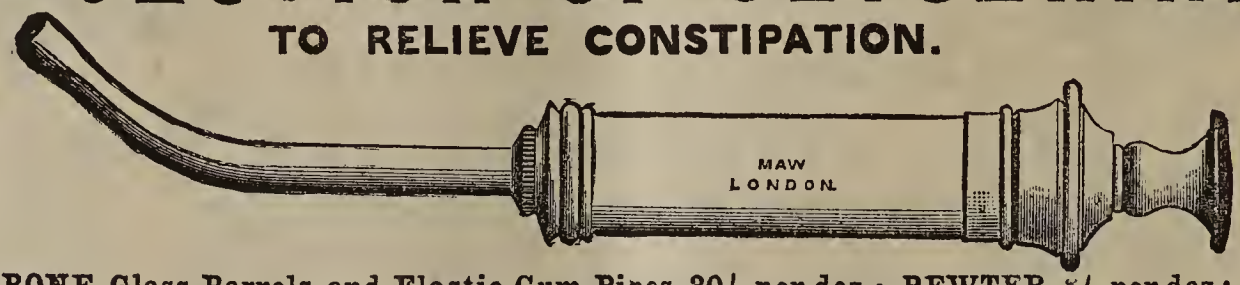

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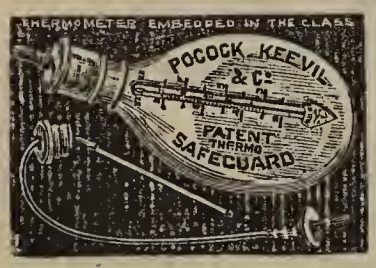

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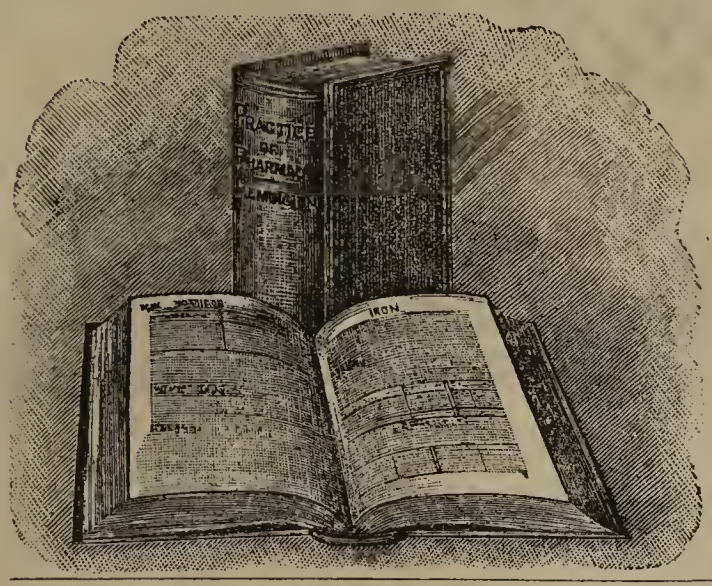

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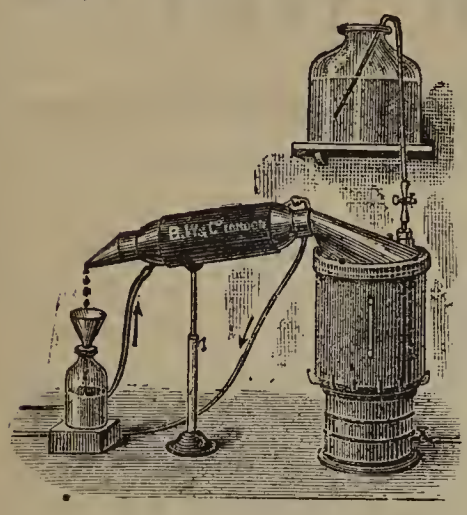

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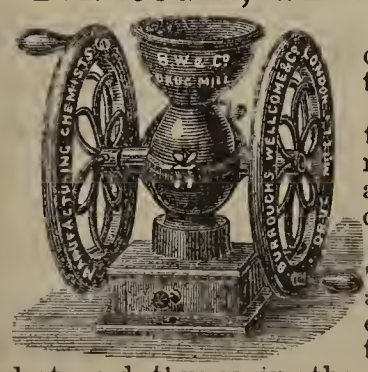

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INTRODUCTORY SESSIONAL ADDRESS

DELIVERED AT THE

COMMENCEMENT OF THE FORTY-SEVENTH SESSION OF THE SCHOOL OF PHARMACY,

October 3, 1888,

By Sir HENRY E. ROSCOE, M.P., D.C.L., LL.D., F.R.S.

As an honorary member of many years standing of the Pharmaceutical Society, it gives me much pleasure on the opening of this the Forty-seventh session of your school to address the students, and to assure them that any assistance and advice which I can afford them at the commencement of what may properly be termed their entrance into professional life will be gladly given. And to begin with, it may not be unsuitable if for a moment or two we contrast the methods of training in vogue in our own country with those existing abroad. The English mind is essentially self-reliant; it prefers to work out its own salvation rather than have that operation performed for it by authority. Hence we find that whilst on the continent the Governments assume the responsibility for the fitness of persons to carry on certain professional duties, we in England, to a large extent, leave the initiative in these matters in the hands of the people who carry on these professions. Our Pharmaceutical Society is a voluntary association of men interested in the progress and welfare of an important profession. We manage our own affairs, aided it is true by a Royal Charter of Incorporation, and by certain Acts of Parliament, which define the scope of our action and give us certain powers, but which leave the whole of the executive and administrative business in the hands of the Society. So that whilst on the continent Government imposes for pharmacists conditions both as to teaching and as to examination, and undertakes the responsibility of giving a governmental stamp of efficiency, this duty in Great Britain, so far as it exists at all, is delegated to a voluntary association. Such a delegation of important functions to a private body of men is I say characteristic of our English habits, and in my judgment it is a wise and a desirable policy which we thus pursue, for it tends to support and keep active that spirit of independence and self-reliance which after all is the life blood of a nation. It throws the responsibility on the shoulders of those whose business it is to bear it, and its work, although perhaps not so widespread or so immediate in its action as that of a Government Department, is more healthy, because it is more capable of rapid adaptation to the changing requirements of the time, and is moreover, as I have said, better suited to our English ideas. But the very fact that our Society has accepted this responsible position of being answerable to the country for the welfare and for the development of the profession of pharmacy necessitates the exercise of the greatest circumspection and the greatest foresight on the part of those upon whom these duties devolve. That this has been successfully exerted in the past is shown, I think, sufficiently by the steady growth of the Society, by the high position which it now occupies in public estimation, and by the large numbers and high standard of the men whom it has received as its members, associates, and students.

Before the year 1841 the body of men trading as chemists and druggists were unconnected by any common tie; the Society of Apothecaries indeed existed, but it had become a medical body and confined its duties more to the recognition of persons desiring to practise medicine than to those who intended to make pharmacy their special vocation. In the above year our Society was founded with the object of promoting a uniform system of education for pharmacists, as well as of providing a benefit fund for its members. From the beginning, the principle of educating those engaged as pharmacists was the predominant idea in the minds of our founders, and by the Charter of 1843 all persons, not already engaged in business, were required to show that they were duly qualified by passing an examination before they could be enrolled as members of the Society. By the Pharmacy Act of 1852, these qualifications were rendered more imperative, and a register of all persons qualified as pharmaceutical chemists was appointed to be kept under the direction of the Society. The distinction moreover was made between persons recognized by the Society as pharmacists, and those who sold drugs without such recognition, but the Act did not interfere otherwise with the sale of drugs or dispensing of prescriptions.

In 1868 an Act was passed further extending the powers conferred by the former Act, inasmuch as it was thereby rendered unlawful for any person to sell, dispense or compound poisons or assume the title "chemist and druggist" unless he were registered either as a pharmacist or as a chemist and druggist. The important principle was thus established that the education of the vendor is the only safe foundation for a Bill regulating the sale of poisons, and that the country possessed a body of men duly educated and registered for this purpose under the Act of 1852. Still it is optional whether persons so registered become connected with our society or not, and as a fact there is a very large number of persons practising pharmacy whose names are on the Register but who are not enrolled in our Society. That all those employed in the sale of drugs should become members is scarcely to be expected; but that the time is coming when the advantages and prestige which membership of our Society offers will be more generally appreciated,

and when the large majority of the profession will join, is, I think, clear. Such membership can only now be gained by distinct and sufficient qualification, as ascertained by examination; the so-called "Minor" admitting for the diploma of chemist and druggist, the "Major" for that of pharmaceutical chemist.

The question may well be asked, Does a mere examination give satisfactory evidence of such qualification—is it *per se* a just test of qualification such as ought to satisfy both the candidate and the public? I, for my part, doubt much whether it is. I believe that the examination is only the hall-mark, and that the teaching is the true gold; that merely passing an examination may put a very false stamp upon a man; but that evidence of proper training, by which I include proper learning, cannot fail to mark a man truly. That this opinion is one generally held is apparent from the fact that every candidate for the Minor examination must produce a certificate that for three years he has, as an assistant, been practically engaged in the translation and dispensing of prescriptions. Whether such a certificate is always produced, or whether, if produced, it means much, I do not know, but of this I am assured on the best authority, that a considerable proportion of the youths who come up as assistants to study pharmacy in our school are as innocent of a knowledge of dispensing as the child unborn, so that the danger depicted in the celebrated story of Dickens's juryman is a present and real one at the latter end of the nineteenth century.

To avoid this evil, to ensure proper qualification by means of thorough training, has always been the aim, and I trust always will remain the aim, of the Pharmaceutical Society. To this end it has already done much, and will, doubtless, in the future do more. In the first place, it has established what may justly be called a normal School of Pharmacy here in Bloomsbury. With our own funds, derived from the subscriptions and donations of members and associates, we have arranged laboratories and lecture rooms, founded and endowed professorships, established a valuable reference library, arranged a unique museum of drugs and pharmaceutical preparations, and collected a most valuable herbarium, all open to the student, and available for teaching purposes. More than this, the Society has lately built the splendid examination hall in which we shall assemble later in the evening, and last, but by no means least, mindful of the growing necessities of the time, it has built and inaugurated special and commodious laboratories for original pharmacological research. Thus, whilst wisely leaving the instruction in the usual courses of practical chemistry in the able and experienced hands of Dr. Attfield, it has given opportunity for the more advanced students and others to work out original problems in the wide field thus laid open to them, under the guidance of Professor Dunstan. And here I should be glad to be permitted to digress for a moment, in order to express my warm appreciation of the action of the Council in this particular matter. Nothing, in my opinion, tends so powerfully to enlarge the mind of the student or to raise the profession of pharmacy to the position in which it ought to stand, as this capability of original investigation. What has done so much to raise the status of English pharmacists as the researches of William Allen, Daniel Hanbury, J. E. Howard, H. B. Brady, G. F. Schacht, W. W. Stoddart, John Williams, Henry Deane, R. Reynolds, T. B. Groves, A. W. Gerrard, and many others whom I could name? Why is it that so much more is done on the continent than we in England can boast of in the preparation of rare drugs, and in the discovery of new ones, of artificial febrifuges and antipyretics, to say nothing of such interesting bodies as saccharin and other products of foreign science and skill? Is it that the German is more gifted than the Englishman? The notion may at once be dismissed as absurd. It is simply because a more ample opportunity is given to him for the study of chemistry in its higher stages and in its application to pharmacy than has hitherto been accorded to us. Your Research Laboratory will do something to set this matter right. It will doubtless be conducted on lines which lead to the extension of our knowledge of the mode of action of drugs, a chapter still almost a blank. The researches therein conducted may any day be the means of bringing to light some new and valuable means of alleviating some of the ills that flesh is heir to. May I not express the hope that on the one hand students may be found able and willing to devote themselves to this work, the crowning point of our edifice, for assuredly they will be well repaid in the end, and may I, on the other, be permitted to urge upon the Council the great importance of fostering the growth and stimulating the activity of this the newest, but also the highest, branch of their Institution by every means in their power?

The determination to make its examinations a reality has, as I have said, always been the aim of the Council; that this end, however, has been altogether accomplished will scarcely be contended even by the most sanguine of its members. Much has been done, but more yet remains to be done. What steps can be taken to render the examination system more effective? Well, the first and most apparent step is to improve and widen the basis of pharmaceutical teaching throughout the country, to assist qualified teachers, and to encourage the establishment of well considered schemes of lectures and laboratory practice in a large number of centres of population. It is proposed to carry these much needed requirements into effect by obtaining parliamentary sanction to a Bill, which amongst

other provisions requires from all candidates hereafter entering the trade evidence of having attended definite courses of instruction in chemistry, botany, and materia medica.

The Society proposes to provide facilities for obtaining instruction all over the kingdom by arranging for the formation of such courses at all places where competent teachers and teaching facilities can be found. What happens at present? Candidates flock to London or to Edinburgh to prepare in a few short months by a vigorous system of cram for the qualifying examination, having in many cases done little or nothing in an educational direction during the three or four years of their apprenticeship. Is it to be wondered at that time after time these young men fail to pass, and that dissatisfaction with the system is the result? Again, at the risk of tedious repetition, I must urge that examinations ought to be a test of teaching, that they ought to be regulated by a proper regard for the teaching, and to be based upon it.

Whilst on this never ending subject of examinations, so ably dealt with in Professor Michael Foster's address a few years ago, may I venture to point out that much can be done to counteract cramming—for good coaching is not a bad thing—by making the examinations practical. A man cannot cram up practical dispensing, or practical chemistry, or practical materia medica. Either he knows how to dispense a prescription, to prepare Fowler's solution, to distinguish between and to point out the peculiarities of the seeds of *Strychnos Nux-vomica* and *Hyoscyamus niger*, or he does not, and such knowledge, if he has it, can only be obtained by *bonâ fide* work and *bonâ fide* instruction.

And here may I express my opinion that in order to make the examinations run smoothly together with the teaching it might be advisable that teachers should have a voice in the examinations. I do not find upon your Boards of Examiners the name of a single teacher. Would it not be a wise step to take advantage of the bye-law enabling the Council from time to time to appoint professors of science, chemists and botanists, to assist the Boards, either as assessors or otherwise? Dare I suggest that even the most active of the prominent members of our Society may perhaps not be so "thoroughly up" in the newest views on the constitution of benzene as the professional scientific chemist, or so well able to set questions difficult to answer by mere cram, and so quick to detect a crammed answer as a teacher who has made such matters a part of his daily work? I fear that the present system may too frequently play into the hands of the crammer, who soon arrives at an accurate guage of the examiner's knowledge, and acts accordingly. Let us do all we can to destroy his machinations and to defeat his nefarious schemes! But let us support in every way in our power the honest teacher whose object is to instruct and to develope. Let us be sure that the faults of our system of examination —for examiners, like candidates, are, I fear, not always faultless—do not strike at the root of our system of teaching, and encourage those very evils of cram which we wish to avoid.

Might it not be well, moreover, if a fuller schedule were published, defining the range of the examination in the respective subjects? This, I know, is a somewhat difficult matter, but my experience—which has been considerable—of examination work leads me to believe that the advantages of a well-considered syllabus are greater than the drawbacks. Then, again, I find no recommendation in the calendar of a definite curriculum of study. The requirements of students I know differ, but I cannot help thinking that a statement of what is thought to be the best course of training might be useful to many.

Now, Mr. President, I have acquitted myself nobly in the character of the candid friend, for I have found as much fault as I can, and have pointed out what I have the hardihood to consider our shortcomings without reserve, whilst I hope that at the same time I have expressed my satisfaction concerning the excellent work which our Council, and especially our indefatigable President, has done and is doing.

May I now again refer to the Bill before Parliament, which the Council did me the honour to ask me to promote? That Bill contains other important provisions than those with respect to educational reform, to which I have alluded, all of which tend, I believe, to the amelioration of those who practice the profession of pharmacy. Its objects — be it remembered — are to obtain powers for the Society to make bye-laws, which before being valid must be confirmed and approved by the educational department of the Privy Council as representing the public. These bye-laws relate in the first place to an important division of the examination for registration as a chemist and druggist into two or more parts, and to the lapse of an interval of time between the said parts. The object of this proposal is to compel the passing of the "Preliminary" before or at the commencement of apprenticeship, and to divide the "Final" into two parts, one of which might be passed during apprenticeship and the other at twenty-one years of age. A second provision requires apprenticeship or pupilage to last for at least three years. The advantages of these are so obvious that no remarks from me are needed on these points.

Now you may ask, seeing that the provisions of this Bill are so evidently for the benefit of the profession and the public, and should, therefore, meet with the general approval of the House of Commons, why has it not passed a second reading? Well, that is due partly to our present political condition, which renders private Bill legislation almost an impossi-

bility, and partly to what I believe to be a misconception on the part of some persons of the action of the educational clauses of the Bill. Some well-wishers to the profession think, with reason, that it would be a hardship to compel men now in business, whether as principals or managers, to go through a course of study and pass examinations. Certainly this would be a great hardship; but no such thing is contemplated. The provision applies only to young men entering the profession, and only to those entering after the lapse of one year from the passing of the Act. "But still there is another hardship," say our opponents; "you compel unfortunate candidates to come to some centre, perhaps far from their business, to attend lectures; this is a hardship." Well, so it may be in some few cases, but is not it a far greater hardship for numbers of young men to come up, year after year, as they do, to London and Edinburgh insufficiently prepared and hence fail to pass for want of proper teaching?

No change of the kind can be proposed which does not bring a certain amount of discomfort to a few; but is this a valid reason for opposing such a change?

What became of the mail coach drivers when the steam horse pushed his four-footed predecessor off the road? They had to become omnibus drivers. But was the travelling public the worse for the change, and is not the class of steam-horse drivers a higher paid and more numerous one than that to which the late Mr. Weller, Senior, belonged? We fully hope that arguments of this kind may soften the hearts and convince the heads of those who opposed the Bill. If it should happily be so, we may get the second reading this autumn. If not, we must begin work again next session in lively hope of better things.

And now, gentlemen, I have detained you fully long, and yet I should like to say one word to the students, especially those entering this year. Still what can I say that has not been said a hundred times before, and a hundred times better than I can say it. But although, "es ist ein alte geschichte" yet "bleibt es ewig neu," the old old story is still for ever green. What is it? Why that success in life depends less on abilities than on patience. Did not Darwin say of himself that this was his characteristic, patience, rather than ability. But you may reply, this patience *is* ability, and therefore I perhaps ought to say patience rather than brilliancy.

Be steadfast, be earnest, remember that what is worth doing at all is worth doing well, and then be sure that your labour will not be in vain, and that in future years you will look back upon the day when you entered this school as the most important, perhaps, even as the happiest, because the most fruitful of your lives.

MANDRAGORA.*

BY PROFESSOR F. COHN.

Mandragora is one of those plants to which considerable historical interest attaches, not only on account of the properties that they really possess, but in a still higher degree because of the powers ascribed to them by popular credulity. From the time of Hippocrates, five centuries before the Christian era, to the first century of the Roman Empire, mandragora was one out of many poisonous and remedial plants of the materia medica of the Greek physicians, so rich in officinal plants. It was used by them sometimes as a soporific, sometimes as an anæsthetic before surgical operations or the application of the actual cautery, in order that the patients thus brought into an unconscious, lethargic condition, might not feel the pain. The hypnotic property of the mandragora was proverbial: it used to be said of a drowsy man that he looked as if he had drunk mandragora. Preferably the root was used, or, rather, the brown juicy bark, since the white pith is inactive. The juice of the root bark was expressed, or a decoction was made, and this was given alone or, more frequently, in wine or vinegar. The same property is, however, possessed by the leaves and fruit, but to a less degree. Extracts from the roots of other Solanaceæ were also used for the same purpose as hypnotics and anæsthetics. The descriptions of the action of mandragora juice given by Dioscorides and Pliny, almost in the same words and with identical doses, leave no doubt that it represented a poisoning by atropine; it is true this alkaloid has not yet been chemically detected in mandragora, but its presence may be inferred from the reported symptoms. So far back as Theophrastus it was stated that mandragora was fatal in too large doses. A chemical investigation is, however, still lacking.

Theophrastus and Dioscorides mention that mandragora was also used as a constituent of love philters, which appears to be explained by the sensual excitement and hallucinations that are observed in atropine poisonings. Consequently mandragora also bore the name "Circe's herb," "*Circæa*" (*Plin.* et *Diosc.*). Pliny passes over this use of the plant, just as on principle he suppressed the names of the aphrodisiac, abortive and toxic materials used in the philter by which Lucullus, the famous conqueror of Mithridates, was poisoned. However, a knowledge of the erotic properties of mandragora would appear to be very ancient, especially if the "*Dudaim*" of the book of Genesis and of the Song of Solomon be correctly translated "love apples" (mandragora berries), as has been done in the Septuagint.

The ancient root collectors and herbalists, who had to supply the Greek physicians with their remedies, delighted to surround their business with mystery and to carry on the collection of medicinal roots under mystic observances, which probably were intended to raise the price of the wares as well as to deter inquisitive competitors. Even the digging up of the mandragora root could not be carried out without wonderful ceremonies, over which Theophrastus makes merry. Neither he, however, nor Pliny, who collected with avidity all the marvellous reports as to medicinal herbs, was acquainted with the fables which made their way from the east, and became afterwards interwoven with the history of the mandragora as the scientific observation of nature of the Roman empire gradually disappeared and simultaneously the mystic religion of the east, as well as the astrology and magic arts of the Syrians, Persians and Egyptians more and more took possession of men's minds.

The fabulous history of a wonderful root,—*Baaras* or

* Extract from a paper read before the Botanical Section of the Silesian Gesellschaft für vaterl Cultur. Communicated by the Author.

Batarites,—which grew in a valley in Eastern Palestine, which shifted its place and could only be held firm in the earth by certain occult means, which shone at night like a star and could only be rooted up by a dog that thereby lost its life, after which the root could be safely carried away, is reported first by Josephus. The story, however, was not applied by him to the mandragora, but to a magic root, which possessed the power by simple contact to drive out evil demons from those who were possessed. Moreover, Ælian, who in the following century (about A.D. 180) recounted the same story about the root "*Aglaophotes*" *or* "*Cynospastos*," which was also named "*Glyciside*," did not refer to the mandragora, but probably to the *Pæonia*.

It is in the records of the fifth century that the mandragora is first recognisable as the mystic root that could only be removed from the earth without danger by the work of a dog. Upon one of the artistically executed miniatures stitched up in front of the actual text of the splendid codex of Dioscorides, known under the name "Codex Constantinopolitanus vel Byzantinus," which was transcribed towards the end of the fifth century for the emperor's daughter Juliana Anicia, and which is at present in the Vienna Court Library, Dioscorides is represented in white professorial robes, sitting upon the golden cathedra under a pillared portico, whilst Scientific Investigation (Heuresis) with one hand presents to him the mandragora plant and with the other holds by a string the strangled dog that has uprooted it from the earth. In a second picture Heuresis shows the mandragora to a painter sitting before an easel, who is drawing it upon a gold-framed white tablet. That this is what is really represented is proved by the illustrations contained in the second, but older and better manuscript of Dioscorides in the Vienna Library (Codex Neapolitanus). Whilst, for instance, in the place where according to alphabetical arrangement mandragora would belong the Codex Byzantinus shows a gap, which was only first filled in in the twelfth century by stitched-in leaves of smaller size and written in another hand, the Codex Neapolitanus contains at the same place, in addition to the text, two illustrations, designated as male and female mandragora (μανδράγορας ἄρρεν and θῆλυ).

At the summit of the brown root of the "female mandragora" are perceptible two small lancet-shaped leaves and a head of long-stalked dark violet bell-shaped flowers, which are five-toothed at the margin and surrounded at the base by a five-partite calyx, the points of which are half as long as the flower. On the two longer stalks small red fruit is already developed exceeding by twice the linear calyx tips. The illustration represents unmistakably the *Mandragora autumnalis*, Spreng. (*M. officinarum*, Bert.).

In the "male mandragora" are seen eight much larger lancet-shaped, beautifully veined, root leaves, with undulate margins, and among them a head of eight long-stalked red spherical fruit, which at the base are surrounded by the calyx tips shorter by one half, and at the top are crowned by the equally long style. The plant represented is the second of the Mediterranean species of *Mandragora*, *M. vernalis*, Bert. Probably the painter drew these figures in the autumn, when *M. autumnalis* was in blossom, whilst only fruit was then present on *M. vernalis*.

These figures therefore confirm the explanation given by the commentators of the fifteenth and sixteenth centuries as to the two kinds of mandragora almost identically described by Pliny and Dioscorides, since they recognized in the "male" or "white" variety of mandragora that at present described as *Mandragora vernalis*, Spr., and in the "female" or "black" mandragora the *Mandragora autumnalis*, Bert. The former was known to the ancients as occurring in Italy, having been first described by Tragus. The latter was found near Cadiz by Clusius in 1576. As to the designations "male" and "female," with the ancients these were used not to indicate difference of sex, but to distinguish between robust and more delicate varieties (*e.g.*, *Filix mas* and *Filix fœmina*), whilst with them the designations "black" and "white" referred not to the exactly corresponding appearance, but to the lighter or darker coloured flowers, as for instance the "white" and "black hellebore" and the "white" and "black violet." Nevertheless the names "male" and "female mandragora" have given rise to a fable, the first traces of which were already apparent in the time of the Romans, but which is first recognized in its full development in the time of the copyists of Dioscorides already referred to, consequently in the fifth century. Whereas for instance, Dioscorides and Pliny gave only a description, referring simply to facts, to the effect that two or three divisions of a root, a yard long, externally brown and juicy, internally white and woody, are twisted round each other, we find Columella speaking of mandragora as "half-man" (*hemi homo*), whilst the lost book on the action of plants attributed to Pythagoras, and cited by Pliny, appears, according to a gloss by the Vienna Dioscorides copyist, to have described it as "anthropomorphous." But at the time when these pictures were painted the fable had already developed further, since in the drawing the root of the "female mandragora" (*M. autumnalis*) resembles a woman, and that of the "male" (*M. vernalis*) a man.

Thus dressed up in fabulous accretions, the knowledge of the mandragora passed from antiquity to the middle ages and from its Mediterranean home to the other side of the Alps. Out of the solanaceous plant, known as to its natural history and medicinal properties, out of the drug used by physicians and poison compounders, had been developed a mystical magic root, which existed only in fancy, and round which had crystallized legends originating in the most diverse nations and times. Originally, probably, known only to the learned,—physicians, monks and ecclesiastics,—to whom the mandragora presented special interest on account of its mention in the Old Testament, and by Josephus and the Arabian commentators on Dioscorides, but gradually passing from their circle into the folk lore, the plant in Germany was early connected with the old Germanic legends of Alraune. According to Grimm, in German mythology, under *Alrûna* was originally designated the wise, all-knowing, prophecy and incantation uttering women of pre-historic German times. Subsequently, the name acquired the signification of an evil spirit, and finally of a mystic root having the figure of a man. A Munich manuscript glossary of the tenth century translates the *Dudaim* as "Mandragora = *Alrûna*." Since the thirteenth century "Mandragora" and "Alraune" have in Germany always been used as synonymous. Hildegardt (twelfth century), and Albertus Magnus (thirteenth century), reported of mandragora not only all the wonderful stories related by Josephus of his *Baaras* and by Ælian of the *Cynospastos*, but further decorated these fables with various additions of later origin. From these it would appear that from the tenth century it was believed that the Alraune was a gallows mannikin, sprung from the seed of a man that was hanged; that when pulled out of the earth by a black dog it shrieked like a child, and that therefore whoever intended to gather it must stop his ears in order not to hear the cries, and so on.

In medieval times there was evolved from Alraune a talisman, household sprite or fetish, which could bring good fortune to its possessor, gold to the poor, favour to the lover, and support to women in child-bearing; but which required to be cherished and clothed lest it should do an ill turn. Now and then an Alraune made its way into a church treasury; afterwards the Alraune became the subject of persecution in the witch tribunals. Even Joan of Arc was asked at her trial *quid fecit de mandragora sua*. In 1603 a woman

was prosecuted in Romoreulin because she possessed an Alraune, and in 1630 three women were whipped at Hamburg for selling one.

Of course the German Alraune of the middle ages had nothing more in common with the actual mandragora, which did not occur naturally north of the Alps and therefore was scarcely ever seen by the people of central Europe. But vagabonds, herbalists and even monks made use of the popular faith in the magic power of the Alraune in that they carved out from the large roots of the bryony or of the common reed (*Arundo Phragmites*) figures resembling a man and sold them secretly at high prices. Botanists, even in the Herbals of the fifteenth century, and afterwards Tragus, Fuchsius, Amatus Lusitanus and Matthiolus, ineffectually denounced this practice. Tragus, who declared he had never seen an actual mandragora, mentions the artifice by which the quacks imitated a head of hair on the roots shaped by them for Alraune by grains of barley stuck in and brought to germination. Matthiolus states that in Rome an Alraune was sold for from twenty-five to thirty gold guelders, whilst as late as 1675 a Leipzig burgher purchased one from the executioner for 64 thalers. Since that time the magic fame of Alraune and the medicinal reputation of the mandragora have entirely disappeared.

PHARBITIS TRILOBA AS A SOURCE OF "JALAP."

In the second part of vol. i. of the 'Mitteilungen aus der medicinischen Facultät der kaiserlich Japanischen Universität,' published at Tokio, M. K. Hyrano discusses the value of this species, a native of Japan, for medicinal purposes. He states that the purgative properties of the official species of convolvulaceæ are due to the presence either of convolvulin $C_{31}H_{50}O_{16}$ or of oryzabin $C_{34}H_{56}O_{16}$ (jalapin of W. Meyer). The drugs used in commerce are jalap root, orizaba root, scammony root and turbit root. Jalap root contains convolvulin, but that of *Ipomœa Orizaba* jalapin, which has a homologous composition with convolvulin, but differs from it by its solubility in ether and chloroform. Scammony root also contains orizabin; the resin contained in turbit root appears to consist at least partially of the same substance as that of orizaba root. The purgative properties of the seeds of *Pharbitis Nil* are due to convolvulin. The native name of *Pharbitis triloba*, of Japan, is "asagawo," and its seeds have long been used as a purgative under the name "kengashi."

A full botanical description of the plant and, in particular, of the seeds, follows.

To extract the active principle, 400 grams of the finely-powdered seeds were twice boiled in alcohol of 90 per cent., filtered, and the pure filtrate decomposed by acetate of lead. The liquid filtered from the lead precipitate, after removing the excess of lead by sulphuretted hydrogen, was evaporated in the water-bath, by which a resinous mass was obtained. This was kneaded in warm water in order to rid the resin from its soluble impurities; and it was further purified by again dissolving in alcohol and precipitating by water. The resin thus finally obtained in the water-bath weighed 27 grams. It was a brittle friable substance; ether extracted from it 10·3 per cent. of almost pure oil. The portion remaining insoluble in ether gave all the reactions of convolvulin. The pure resin was easily soluble in alcohol, but insoluble in bisulphide of carbon or chloroform; after treatment with dilute hydrochloric acid it reduced alkaline copper solution. Like convolvulin, it exhibited the chemical properties of a glucoside, splitting up, under the action of mineral acids, into sugar and convolvulionic acid $C_{13}H_{23}O_3$, which forms a crystallizable salt with barium, soluble with difficulty in water, but readily in alcohol.

The author concludes that the resin obtained from *Pharbitis triloba* may be used officinally in the place of resina jalapæ.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 6, 1888.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE INAUGURAL SESSIONAL ADDRESS.

AMONG the addresses delivered at the commencement of the educational sessions of the School of Pharmacy during the last few years, by men distinguished in various positions that are more or less indirectly connected with, though outside pharmacy, that given by Sir HENRY ROSCOE last Wednesday is certainly not the least important, whether considered in regard to its general tenour or its special application to circumstances that are now attracting the attention of the general public, the Legislature and the pharmaceutical community. The public position of Sir HENRY ROSCOE, as a Member of the House of Commons, as well as his past great experience in connection with the educational work of the Owens College, Manchester, lend an exceptional significance to the views which he expressed on that occasion, and should command for them most attentive consideration by everyone who is practically engaged in the work of pharmacy. Moreover, the part he has taken in promoting the Pharmacy Acts Amendment Bill now before Parliament must necessarily have led him to inquire into the present condition and requirements of pharmacists in this country, and hence it is most appropriate that he should have kindly undertaken to deliver the address inaugurating the session now commencing. Naturally we find in that address that the fundamental principle of the founders of the Pharmaceutical Society, as to education being the primary essential for persons engaged as pharmacists, meets with unqualified approval and acceptance. The only question raised on this point is one as to the extent and nature of the means by which pharmaceutical qualification is to be acquired on the basis of education. Contrasting continental systems with our own, Sir HENRY acknowledged a preference for the independent and voluntary action which precludes any necessity for the Government to impose upon pharmacists conditions as to training and examination. But he pointed out that the delegation of important functions in this respect to a voluntary association of pharmacists, while affording scope for adaptation to the changing requirements of the time, also throws upon that body the responsibility of

taking whatever steps may be necessary from time to time for developing the methods of pharmaceutical training, so as to satisfy the needs of the public, as well as secure the welfare of those engaged in the exercise of pharmacy. It is satisfactory to find Sir HENRY ROSCOE acknowledging that there is reason to think this has been done successfully in the past. But while admitting that to be the case, there is no indecision in the view he expressed as to the present insufficiency of the mode by which qualification has hitherto been obtained. So far from being satisfied with mere examination as a test sufficient at once for the requirements of the public and of candidates he declares his conviction that teaching is the true gold and that examination is to be regarded only as the hall-mark. The mere passing of an examination may put a very false stamp upon a man, but evidence of proper training and teaching cannot fail to mark a man truly.

While enforcing in regard to pharmaceutical qualification this view of present requirements that are essential in the public interest and also for the welfare of pharmacists, Sir HENRY ROSCOE was not unmindful of the fact that the development of a class of competent pharmacists from the heterogeneous body of men who traded under the name of chemist and druggist before the year 1841 must necessarily be gradual in its progress and promoted by successive steps of amendment. In that sense the provisions of the several Acts of Parliament are admitted to have been suitable for the time and to have carried out as far as was then possible the educational principle of the Society. But the work has not been completed, and further advance in the realization of that principle is necessary. To enforce this opinion reference was made to the subject of research, and while recognition was given to the few who have done service in that direction, to the credit of English pharmacy, the question was asked why so much more is done on the Continent, and especially in Germany, than we in England can boast of in the preparation of rare drugs, the discovery of new remedies, and the production of such bodies as artificial antipyretics, saccharin, etc. Sir HENRY ROSCOE dismisses as absurd the idea that the German is more gifted than the Englishman; but knowing, as he does, the different conditions that obtain in the two cases, he declares that the explanation of the fact is simply the more ample opportunity given to the German for the study of chemistry in its higher stages and in its applications to pharmacy or other useful purposes. The work of the Pharmaceutical Society in the past has been directed to the removal of the disabilities similar to those by which, as a nation, we have been of late years placed at a progressively increasing disadvantage as compared with foreigners. Since the great exhibition of 1851 afforded opportunity for all the world to ascertain the possibilities of productive industry, manufactures of all kinds have sprung into existence on the continent, and under the beneficial influence exercised by a century's cultivation of chemistry, the products of those manufactures have replaced the supplies formerly drawn from this country. In some instances such foreign products have even been brought into the English market at prices which barely admitted of competition. But though these results are to be attributed in great measure to neglect of chemistry, which is not cultivated here as in Germany, but only professed or at best followed as an amusement, the Pharmaceutical Society can claim the credit of having been the first public body to recognize the importance of the practical study of chemistry and also of having been the first to establish a laboratory for the purpose in 1844. So far as pharmacy is concerned, therefore, the means of studying chemistry has been in existence, and it is only from the want of a sufficient appreciation of its value that advantage has not been taken of the opportunity thus offered. The more paternal and compulsory system followed on the continent is free from this defect which it will be necessary to remedy in some way as regards ourselves.

So far as pharmacy is concerned, Sir HENRY ROSCOE recommends a general improvement and widening of the basis of pharmaceutical teaching throughout the country as the proper and most efficient means by which the examination system may be made a reality. With that object he would assist properly qualified teachers and encourage the establishment of well considered schemes of lectures and laboratory practice in a large number of local centres. It is to render such arrangements effective and serviceable that parliamentary sanction is required to the Bill now under consideration. By such means adequate training and teaching would be provided, and an end would be put to the influx of candidates for examination who have not had the advantage of any educational training, but on the strength of a few weeks' vigorous cramming present themselves before the examining board on the chance of being able to remember enough of what they have been told to answer the questions put to them, and thus obtain the hall-mark that would properly be given only to those who were thoroughly educated. Apart from the mischievous effect of repeated trials to pass under such conditions, it must be evident that those who are properly qualified will be seriously injured by the unearned qualification accorded by accident to men who are unfit to receive it. On that ground alone there ought to be a vigorous effort made by the younger members of the pharmaceutical body to support the Bill now before Parliament, as being the only

measure of protection for their interests that is possible or to be hoped for. In regard to the examinations themselves, one of the changes suggested by Sir HENRY ROSCOE is the appointment of professors, chemists, botanists, etc., to assist the examiners. It is a growing opinion that a good teacher must make a good examiner from his habitual experience as a teacher. In the abstract, that is no doubt a sound view, though its application in practice may not in all cases be so easy as it would be at a university. The question of expense would also have to be considered, but the idea is nevertheless worthy of consideration, as is any other suggestion that would help to defeat the contrivances by which spurious qualification can be obtained.

The inaugural meeting of the fourth session of the Sheffield School of Pharmacy will be held in Montgomery Hall, New Surrey Street, on Wednesday evening next, October 10, at half-past seven o'clock, when an address will be delivered and prizes distributed by Dr. Symes of Liverpool. Immediately after the conclusion of this meeting the annual dinner of the Sheffield Pharmaceutical and Chemical Society will take place in the Masonic Hall. The lectures and demonstrations arranged to be held in connection with the above-mentioned school during the coming session include courses on Botany, conducted by Mr. G. A. Grierson; Materia Medica, by Mr. J. Humphrey; Practical Pharmacy, by Mr. G. Ellinor; Chemistry and Physics, by Mr. S. T. Rhoden; and Practical Chemistry, by Mr. J. H. Worrall.

* * *

The Executive of the Chemists' Assistants' Association has issued a Programme of Meetings arranged for up to the end of December, which gives promise that the coming session of this valuable Association will be at least equal to any of its predecessors. The session will open on Thursday, October 11, with an Address from the President, Mr. E. J. Millard, which will be delivered in the room of the Association, 103, Great Russell Street, W.C. The papers announced for succeeding Thursday evenings are on "Gum Arabic and its Substitutes," by Mr. T. A. Ellwood; "The Chemical Processes which accompany the Germination of Seed," by Professor Green; "The Adulterations of our Breakfast Table," by Mr. A. W. Stokes; "Photography," by Mr. F. V. Butterfield; and "Standardized Pharmaceutical Preparations," by Mr. F. W. Ransom. There will also be an evening devoted to short papers by members, two "musical and social" evenings, and the Annual Conversazione will be held on Thursday, November 15. In connection with this Association, also, the "Burroughs-Wellcome" Prize of £5, with a copy of Remington's 'Practice of Pharmacy' and the Association Silver Medal added, will be awarded for the best essay describing recent practical researches, discoveries and improvements in pharmacy, competitors being required to send in their manuscripts before the 1st of December. Further information may be obtained by application to the Honorary Secretaries, Messrs. W. J. I. Philp and Mr. A. C. Stark.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, October 3, 1888.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Allen, Atkins, Butt, Cross, Evans, Greenish, Hampson, Hills, Martin, Newsholme, Nichol, Richardson, Robbins, Savage, Schacht, Southall and Symes.

The minutes of the last meeting were read and confirmed.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemist.

John Evans, Brighton, having passed the Major examination and tendered his subscription for the current year, was elected a "Member" of the Society:—

ASSOCIATES IN BUSINESS.

The following, having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Cocks, Walter James .....Stow on the Wold.
Gibson, Matthew Henry.....Burton on Trent.
Pirie, James ....Keith.
Reid, David Speid Clark .....Glasgow.

Modified.

Smithson, John .....Brighton.

ASSOCIATES.

The following, having passed their respective examinations, and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Minor.

Stark, James .....Liverpool.

Modified.

Collett, William James .....Fakenham.
Kay, John.....Crewe.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Ashton, Henry Maitland .....London.
Auld, William .....Liverpool.
Barnes, Ivor Puxon..... .....London.
Drabble, Frederick Pearson ...Rotherham.
Dunlop, Thomas William .....Berwick-on-Tweed.
Harding, Henry Gladstone.....Ealing.
Hebbeler, Karl.....London.
Humfrey, William Henry .....Romford.
Hughes, Thomas Edward .....Newtown.
Jenkins, Hugh Llewellyn .....Llanelly.
Mallinson, Frederick William Spalding.
Negus, John Henry.....Northampton.
Oldfield, Alexander.....London.
Rees, Joseph.....Brynamman.
Roper, Herbert Carr .....Oundle.
Scott, Walter Carey.....Northampton.
Trick, Walter Henry .....Shebbear.
Walwin, Walter .....Warminster.
Wileman, Frederick Walter ...Lincoln.

Several persons were restored to their former status

in the Society upon payment of the current year's subscription and a fine.

Restorations to the Register.

The names of the following persons who have severally made the required declarations and paid a fine of one guinea were restored to the Register of Chemists and Druggists:—

James Ellis, Barr Street, Tungamah, Victoria.
Thomas Oliver Quibell, Newark, Notts.

Additions to the Register.

The Registrar reported that—

Walter Thomas Norman Knock, Alma Villa, The Greenway, Uxbridge, and

Edward Poulson, 135, George St. East, London, E., having respectively made declarations that they were in business before the passing of the Pharmacy Act, 1868, and these declarations having been duly supported, their names had been placed on the Register.

Reports of Committees.

FINANCE.

The report of this Committee included a recommendation of the payment of sundry accounts, and also the sale of £1500 new 3 per cents., the proceeds to be carried to the General Fund to recoup the payments already made for the new buildings.

The President, in moving the adoption of the report, said there was nothing calling for special notice on the receipt side. The expenditure was heavier than usual, as two months payments were included, and several quarterly payments had to be made. With regard to the sale of stock he should ask the Council to authorize the sale of an amount not exceeding £2000, though £1500 only was required at present.

The report was adopted, and a resolution passed authorizing the seal being affixed to a power of attorney for the sale of stock.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£5 to the widow (aged 58) of a member, who has had three previous grants of £10, the last being in November, 1886. (Birmingham.)

£10 to a member (aged 75) who was a subscriber for fifteen years. Has failed in business, and is without any means of support. (Cardiganshire.)

£10 to be placed in the hands of the Secretary to be employed as a casual fund.

Three applications had not been entertained, and one had been deferred for further information.

The Next Election of Annuitants.

A statement had been presented by the Secretary showing that in October, 1887, there were forty-six annuitants on the list, and that six were added in December, but three had died during the year, leaving forty-nine still on the list. Two candidates were unsuccessful at the last election, and five had been put on the approved list during the year. The Committee recommended that three annuitants be elected in December next, the election to take place on December 6.

Candidates for an Annuity.

Augusta Jones, Marlborough.
Mary E. Spendelow, Liverpool.
Eliza Brown, Coningsby.
Richard J. Chapman, Aberystwith.
Hannah C. Edwards, Stoke Newington.
Henry G. Mumbray, Prestwich.
Elizabeth J. Stevens, Lichfield.

The Vice-President moved the adoption of the report and recommendations. With regard to the election of annuitants he said the Committee had been forcibly reminded of the observations of the President last year, when he pointed out that unless increased subscriptions were obtained the time was not far distant when the Council would be unable to continue the practice of electing six annuitants annually. It was his duty, and a painful duty it was, to say that that time had now arrived; and that the Committee could not, with due consideration of the funds at its disposal, recommend the Council to sanction the election of more than three additional annuitants.

Mr. Savage seconded the motion.

Mr. Hampson asked how many candidates there were on the list.

The President said, seven.

Mr. Hampson remarked that in that case four would be left unelected. He should like to know to what extent the Fund had declined, as compared with this time last year.

The Vice-President said it was not so much the decline of the Fund as the fact that the annuitants had lived on. Last year six had died, but this year only three. The Fund was not quite in so good a position as at this time last year, though it was hoped that before the end of the year it would be brought up to as good a position as last year; but the important fact was that there were more annuitants living now than there were last year.

Mr. Robbins said that the election of three new annuitants would bring up the total number to the same as it was last year, viz., fifty-two.

The President said he thought the Committee had acted wisely in this case. Last year the Committee recommended the election of a small number, and the Council decided to elect a larger number; but as he then said, there was a possibility that some of the annuitants who were very aged would pass away, and this had taken place. It was very desirable to be able to elect a small number each year, even though there were few or no deaths. It was obvious that if all the annuitants continued to live another ten years, it would not be possible to go on adding a large number every year; but it was an advantage to the Fund that there should be an election every year, and he had therefore much pleasure in supporting the recommendation of the Committee. It would be much better to elect three now, with a pretty safe prospect of being able to elect three or perhaps four next year than to elect a larger number now, and perhaps not be able to elect any next year.

The motion was then agreed to unanimously.

Carbolic Acid and the Poison Schedule.

Mr. Symes moved the following resolution, of which he had given notice:—

> "That by virtue and in exercise of the powers vested in the Council of the Pharmaceutical Society of Great Britain, it resolves and declares that Carbolic Acid ought to be deemed a Poison within the meaning of the Pharmacy Act, 1868, and ought to be deemed a Poison in the second part of the Schedule A of the said Act."

He said it was not necessary for him to say much in support of this motion. In February, 1882, a resolution was moved by the President and seconded by himself that certain poisons should be included in Schedule A of the Pharmacy Act, and all the members of Council then thought that they were doing a public duty in passing that resolution. The result, however, was not all that they desired. In August of the same year the Clerk to the Privy Council wrote that their Lordships after careful consideration were of opinion that pending further legislation with respect to the sale of poisons it was not desirable to put restrictions on the sale of the acids and other articles referred to in the resolution. On that occasion nux

vomica and its preparations were added to the schedule, but the other articles, including carbolic acid, were not. At that time no doubt further legislation connected with the sale of poisons was contemplated by the Government, and it was felt that there was a certain amount of reason in the argument, that if the whole question were going to be dealt with it would be as well to wait. But the Council had waited for six years and a half; no further legislation had taken place, and hundreds of cases of poisoning by carbolic acid had occurred. Being a resident in Liverpool, where nine or ten cases of poisoning by this agent had occurred within a less number of weeks, it seemed only fit that he should bring forward this motion on the present occasion. He understood that a communication had been sent to the Council from the Health Committee of Liverpool.

The PRESIDENT said it was simply an inquiry what had been done, and the Secretary had replied, stating what had taken place in 1882.

Mr. SYMES said he had written to the Mayor of Liverpool on the matter, who informed him that he had passed his letter on to the Health Committee, from whom he had again heard to the effect that that Committee fully appreciated the importance of the matter, and had communicated with the Privy Council upon it. On the former occasion when the subject was considered, it was felt that it was fairly open to discussion, how far the placing of carbolic acid on the schedule would interfere with trade; its value was recognized as a disinfectant which was very largely in use, and it was felt that anything which would interfere with its general use would do harm. The Council also knew that certain manufacturers were very anxious about the matter, and during the last fortnight Messrs. Calvert and Co. had written to one of the Liverpool papers, admitting the desirability of some legislation on this subject, but taking exception to the only means recognized by law for regulating the sale of such articles. They said it would be a very serious matter to an important trade if carbolic acid should be so scheduled that it could only be obtained through one business channel and in one class of packages. The Council might expect some little opposition, no doubt, from manufacturers, but after the number of cases of poisoning which had occurred, and after the representations made to the Privy Council on the subject—which would have been much more numerous but for the fact being known that Liverpool was moving in the matter, as appeared from some remarks made by the Coroner at Southport—it might be hoped that the interest of manufacturers would not be allowed to interfere with wholesome restrictions on the sale of a poison which was responsible for such a large number of deaths. Placing this article in the poison schedule would in no way interfere with its sale in wholesale quantities, so long as it was properly labelled, which no one could object to; and when sold in retail quantities it would be always properly labelled by responsible and educated persons. At present, anyone, even a child, could take a ginger beer bottle and get 2*d.* or 3*d.* worth of carbolic acid, and in large towns it was often sent out in that way without even a cork, with no label, and with no precaution whatever. No interference would take place with the distribution of this article by Local Boards of Health, who used it very largely, but its being placed in the schedule would no doubt lead to greater care being exercised in the manner in which it was sent out. He hoped the resolution would be passed unanimously.

Mr. HAMPSON seconded the motion. It was quite possible that six years ago the presence of the mineral acids in the list submitted had something to do with its non-acceptance by the Privy Council, but the events of the past six years afforded abundant proof of the necessity for something being done, and it would be very strange if the medical department of the Privy Council were not alive to the importance of this question. He thought the Department could hardly hesitate or demur now to accept this proposal, particularly as carbolic acid differed from the other mineral acids in many respects. The number of deaths which had been caused by it was so great that the Council would not be doing its duty unless it passed this resolution.

The VICE-PRESIDENT agreed with the mover and seconder of the motion that, in the interest of the public it was most desirable that carbolic acid should be placed in the schedule, but remembering what occurred six years ago, when a list was sent to the Privy Council, containing carbolic acid and sundry other poisons, he felt some doubt whether it would not be somewhat retreating from the position then taken up if this resolution alone were now sent. Did the Council think that the mineral acids no longer required to be placed in the schedule? He, for one, thought the same reasons still existed, and he should much prefer calling the attention of the Privy Council to the former resolution, and reminding it that the responsibility rested on it for not having carried the resolution into effect. In Liverpool and elsewhere, censure had been passed on the Council of the Pharmaceutical Society for not doing its duty, but the truth was that the whole responsibility lay with the Government.

The PRESIDENT said the same view had occurred to him. He thought it would be quite as effectual to write to the Privy Council saying that the attention of the Council had been called to the increasing number of deaths from carbolic acid, reminding it of the former resolution and pointing out that the responsibility of not placing carbolic acid in the schedule rested practically with it. It was rather a defect in the Act that when once an article had been placed in the poison schedule there was no means provided for removing it or altering its position, and he knew that that had been pointed out more than once as a difficulty in the way of placing an article in large demand in the schedule.

Mr. RICHARDSON asked if the deaths referred to had been accidental, or were they cases of suicide?

Mr. SYMES said he believed seven out of eight were accidental.

Mr. RICHARDSON thought it was the duty of the Council to take some action, and he should prefer adopting Mr. Symes's motion. It was quite time some measures were taken by a body which was supposed to look after the interests of the public, and after such a tremendous series of cruel accidents, he thought the Council should do something more than call attention to a resolution passed six years ago, of which no notice had been taken. The Privy Council might sanction the placing of carbolic acid in the schedule, but he questioned if it would do the same with the mineral acids which were so largely used in commerce and manufactures. He saw the difficulty in the case of those acids on the former occasion, and he thought it would be much better now to confine attention to carbolic acid only.

The PRESIDENT remarked that the Council had already resolved that carbolic acid should be placed in the schedule.

Mr. RICHARDSON asked if that resolution was not rescinded by lapse of time.

The PRESIDENT said no.

Mr. SYMES said his view was that the Privy Council had refused to accept it.

Mr. ATKINS said he should support the motion. If he remembered aright, he thought on the previous occasion that it would be unwise to include the mineral acids as being in restraint of trade, but he had not the same feeling with regard to carbolic acid. He

thought a deputation from the Council had an interview with Lord Carlingford, who distinctly called attention to the argument about the restraint of trade; but at any rate there were serious doubts about including the whole of the list, and while it would no doubt be well to remind the department of the previous resolution, he did not see that there was any good reason why one article out of the list should not be selected for special legislation.

Mr. CROSS said he had held the opinion for a long time—before he was a member of the Council—that the mineral acids should only be sold in retail quantities by responsible persons only. The very fact that there were so few accidents from their use arose mainly from the other fact that in many towns, such as his own, their sale was in the hands of chemists only. It was a very unpleasant part of their business, and not a profitable one, but they looked upon it as part of their duty, and did not charge exorbitant prices. When a small tinman increased his business very largely he was able to have a carboy of acid at a time, but until then he was very glad to go to the chemists and pay 3*d.* or 4*d.* a pound for the small quantity he required; it was properly labelled, and the label was renewed each time the bottle was presented, and thus accidents were prevented. Restrictions on the sale of poisons were only of use to prevent accidents; a person intending to commit suicide would obtain them somehow. Only the other day a man bought a pint of carbolic acid from him, scraped the label off the bottle and drank the contents. The only way to prevent accidents was to put the sale into the hands of responsible persons. He, therefore, was rather inclined to adopt the Vice-President's view and call attention to the previous resolution; perhaps the Privy Council might do now the same as it did then, and adopt one article out of the list.

Mr. BUTT remarked that in the last report of the Registrar-General it was stated that 34 per cent. of the suicidal deaths were caused by acids, especially carbolic acid.

Mr. ALLEN said he agreed with the argument of Mr. Cross; but at the same time he doubted the expediency of mixing up mineral acids with carbolic acid at the present moment. Some indication had been given of what was in the mind of the authorities later than six years ago, because a Poison Bill had been introduced in which the mineral acids were put in a place by themselves as poisonous articles. But the number of deaths which had occurred showed that carbolic acid was especially dangerous, and that it was the favourite article with suicides.

Mr. EVANS thought it very necessary to pass the resolution, though it might be as well to call attention to the former one at the same time, and also to point out the danger arising from the free distribution of carbolic acid by local boards, with a view to inducing them to adopt greater precautions. In his own town it was distributed in thousands of gallons, and he thought local authorities should be required to adopt the same precautions as a chemist or any other tradesman. With regard to the mineral acids he did not think the retail sale was of much importance, but they certainly ought to be in the poison schedule.

Mr. HILLS said he was inclined to vote for the motion as it stood, with the addition of some little reminder that six years ago the Council had recommended that carbolic acid should be placed in the schedule. He hoped that the subject of the mineral acids would not be brought up now, as it would only complicate the question. Mr. Williams and some others were much opposed at the time to the suggestion that those acids should be placed in the schedule, and he very much sympathised with them. He might point out that it was not proposed to include preparations of carbolic acid, so that the sale of carbolic powders and other matters which contained the acid in a dilute form would not be interfered with. He always understood that the reason why carbolic acid was not put in the schedule was because in the opinion of the Privy Council the advantages of its general use were likely to outweigh the dangers.

The PRESIDENT said there did not seem to be any real difference of opinion on this subject. He did not understand the Vice-President to wish to insist on adding the other articles to the list.

Mr. SYMES said he thought the Vice-President differed from him in not regarding the answer from the Privy Council in 1882 as final. He thought it was intended to be a final answer, because it referred to further legislation; that further legislation had not come about, and he therefore accepted the former answer as a refusal, and moved this resolution *de novo*. He should be still inclined to press the original resolution for the reasons already stated by several speakers, but thought the case with regard to carbolic acid would be weakened if other things were mixed up with it. The case in that respect was very strong, and there ought to be no difficulty about it. The number of persons interested in its manufacture and otherwise was comparatively small, and there were not the same difficulties as in the case of the mineral acids. It would be understood that preparations and dilute forms of carbolic acid might still be sold as at present; and he might say that a great deal of the safety in the use of the acid in large hospitals arose from the fact that it was never distributed in the concentrated form.

Mr. SCHACHT said there were really two questions to be considered; one, the propriety of passing the resolution, on which he thought all were agreed; and then, secondly, how the expression of opinion therein contained should be conveyed to the Privy Council.

The PRESIDENT thought the best way would be to send the resolution with a letter from the Secretary, referring to the former resolution and the Registrar-General's reports on the subject of carbolic acid.

Mr. SYMES said he was aware that no legislation would affect the dealing with carbolic acid by Local Boards, but he believed it would have a great moral influence in inducing extra care.

Mr. RICHARDSON said it was generally distributed in a dilute form.

Mr. MARTIN pointed out that it would be rather dangerous to introduce the question of dilution, and only restrict the sale of the pure article, because as a fact absolute carbolic acid was never sold.

Mr. RICHARDSON said if the motion were accepted by the Government, no doubt some definition would be given of what was to be considered carbolic acid.

Mr. SYMES remarked that a great many things were sold under the name which were not carbolic acid at all.

The PRESIDENT said the objection had been made formerly that the placing of carbolic acid on the list would be a restriction on its use for sanitary purposes; the answer to that was, that it might be used as freely as ever if proper precautions were taken. He should be sorry to say anything about dilution.

Mr. ATKINS said it would be quite safe to let it stand in the schedule as carbolic acid, without adding "and its preparations."

The motion was then carried unanimously.

RETIREMENT OF MR. BAILDON.

The PRESIDENT announced that he had received a letter from Mr. Baildon, saying that with the greatest reluctance and regret he felt compelled to tender his resignation as a member of the Council. He desired to thank all his colleagues for the great kindness and courtesy he had met with, and to express his deep sense of the honour done him by the members of the

Society in electing him on the Council. As a last word, he would urge them and all members of the craft to be united, as it was only thus that any class of men could obtain their demands or fulfil their aspirations. In order to secure this union it would be necessary for individuals to postpone their personal opinions and even their personal interests to a common cause. He could not but think that it lay within the power of those who already belonged to the Society, and still more of those who did not, to raise the Society to a position in which it could command the attention of Parliament in a manner it was idle to expect at present. In conclusion, he expressed the hope that the choice of his successor would fall on someone who was not only a good pharmacist, but would be able to keep the Council in touch with the feelings and opinions of their brethren north of the Tweed. He (the President) begged to move—

"That this Council desires to record its high appreciation of the services rendered to the Society by Mr. H. B. Baildon as a member of the Council, an examiner, and Chairman of the Executive in Scotland, and regrets that Mr. Baildon feels himself unable to continue on the Council."

The PRESIDENT continuing, said Mr. Baildon was a comparatively young member, and it was a matter of great regret that the Society could not retain his services, especially as the number of those who could undertake the responsible duties of the Council were so few. He had looked forward to Mr. Baildon representing the Council in Scotland and elsewhere for many years to come, and had rather congratulated himself a few months ago on the fact that there were a certain number of men at that table who were young enough to do a great deal of hard work if necessary, and he was very sorry that Mr. Baildon had felt obliged to leave the ranks. Although he had not been long a member of the Council, he was for many years a member of the Board of Examiners in Scotland, and in the recent adjustment of the relations of the Society with its officers, members, and property in Scotland he took a prominent part. After the re-organization had been effected he was made Chairman of the Executive, and he had acted in that capacity and as Treasurer in Scotland with very great care and judgment.

The VICE-PRESIDENT had much pleasure in seconding the motion. He could not add anything to what had been said as to the loss the Council would sustain in the withdrawal of Mr. Baildon. It had been his privilege for more than 25 years to know what able representatives had been sent up from Scotland, gentlemen who had done the Society much service, men like Mr. Macfarlane, Mr. John Mackay, and Mr. Young, and he was looking forward to receiving a large amount of benefit from Mr. Baildon. He still hoped that Mr. Baildon would one day reconsider his position and come back amongst them.

Mr. HAMPSON said the resignation of Mr. Baildon was a great misfortune, inasmuch as it severed to a certain extent the new bonds which had been established between the Council and Scotch brethren. He had always had a great admiration for Mr. Baildon, because he knew the difficult task he had to perform and how ably he had accomplished it. It would be very difficult to fill his place adequately, and he hoped that after a time Mr. Baildon might rejoin the Council, and that in the meantime some representative would be chosen who would maintain the amicable relationship which existed between the Society and its members in Scotland, for it would be very sad if the amity which now existed should in any way be lessened.

The motion was carried unanimously.

LOCAL SECRETARY.

The PRESIDENT moved that Mr. Walter Lloyd be appointed Local Secretary for Carmarthen, in the place of Mr. R. M. Davies, deceased. Mr. Davies, although he had not had extended opportunities of aiding the Society, had always shown a desire to do the best he could to advance its interests.

The motion was carried unanimously.

GALEN PLACE.

The PRESIDENT said a communication had been received from the District Board of Works, to the effect that the thoroughfare formerly known as Pied Bull Yard had been re-named Galen Place.

REGULATIONS IN RESPECT TO POISONS.—NOTICE OF MOTION.

Mr. SYMES gave notice that at the November meeting he should move—

"That this Council reconsider the question of recommending to the members of the Society the desirability of adopting and submitting to the Privy Council for approval some regulations for the keeping and sale, or dispensing of poisons as required by the Pharmacy Act of 1868."

He mentioned it publicly in order that the members at large might have an opportunity of considering the subject.

GENERAL PURPOSES COMMITTEE.

The report of this Committee included the usual letter from the Solicitor stating the progress which had been made with cases placed in his hands. Two offenders had paid the penalty demanded.

Cases of alleged infringement of the Pharmacy Acts had been considered, and in three of them proceedings were recommended. One case had been deferred for further inquiries.

The report, as usual, was read and considered in Committee. On resuming the report and recommendations were unanimously approved on the motion of the PRESIDENT.

THE SHEFFIELD PHARMACEUTICAL ASSOCIATION.

Mr. NEWSHOLME said he had been requested by Mr. Learoyd, President of the Sheffield Pharmaceutical Association, to invite the Council, individually or as a body, to attend the opening meeting of the Association, on Wednesday, the 10th inst., when Mr. Symes had promised to give an inaugural address. After the notice Mr. Symes had just given, he thought it probable that gentleman would need all the support he could get.

EVENING MEETING.

Wednesday, October 3, 1888.

The first Evening Meeting of the session was held on Wednesday Evening the 3rd inst., the chair being taken by the President, Mr. MICHAEL CARTEIGHE, at half-past 8 o'clock. The theatre was densely crowded by ladies and gentlemen. The President first called upon the Professors of the School of Pharmacy to present their report on the last examinations.

REPORT ON THE CLASS OF PRACTICAL CHEMISTRY.

Professor ATTFIELD reported that the prizes in the Practical Chemistry class had been awarded as follows, after two full days' examination, every precaution being taken that there should be a fair field and no favour for all the candidates. He also stated that Mr. Lewis Ough would have won the Silver Medal but for the fact of his being disqualified from circumstances not under his control.

Silver Medal	William Appleton Salter.
Bronze Medals	Lewis Ough.
	Henry Baker Davis.

Certificates of Honour... Frank Browne.
Herbert Spargo.
Alfred Mander.
Equal. Edward William Lucas.
Richd. Tildesley Jennings.
George Munnerley Baxter.

The questions set for this examination will be found in the *Pharmaceutical Journal* for August 4, p. 99.

Report on the Class of Chemistry and Chemical Physics.

Professor Dunstan then reported the result of the examinations in the class of Chemistry and Chemical Physics. He said he need only add that he had been thoroughly satisfied with the work of all his students during the year. The successful competitors were :—

[Five months' course.]

Bronze Medal .....Lewis Ough.
Certificates of Honour .. James John Davies.
Henry Baker Davis.

[Ten months' course.]

Silver Medal.....William Appleton Salter.
Certificates of Honour .. Alfred Mander.
Richard Tildesley Jennings.
Frank Browne.

The questions set at these examinations will be found in the *Pharmaceutical Journal* for July 28, p. 75.

Report on the Botany Class.

Professor Green, in reporting on the competition in Botany, said he might, if time allowed, repeat what was said by his predecessor, Professor Bentley, last year as to the conduct of the pupils. The successful competitors were :—

[Five months' course.]

Bronze Medal .....Lewis Ough.
Certificate of Honour ..... Henry Baker Davis.

[Ten months' course.]

Silver Medal.....Alfred Mander.
Certificates of Honour... William Appleton Salter.
Richard Tildesley Jennings.
Edward William Lucas.

The questions set at these examinations will be found in the *Pharmaceutical Journal* for July 28, p. 76.

The Herbarium Prize.

Professor Green reported that only one herbarium had been sent in for the prize. It contained about three hundred specimens and presented evidence of very careful work. On his recommendation the award had been made by the Council as follows :—

Bronze Medal ....Alfred Atkinson.

Report on the Class of Pharmacy and Practical Pharmacy.

Mr. Ince reported on the Pharmacy Class, and said the determination of the Council to have a separate prize examination in pharmacy had given great satisfaction to the students, and he believed would add to the usefulness of the School. He also remarked with satisfaction on the good work done in this competition by the Bell scholars, showing the advantage in technical studies of a good preliminary education. The results were as follows :—

[Five months' course.]

Bronze Medal ....Lewis Ough.

[Ten months' course.]

Silver Medal.....Alfred Mander.

The questions set at these examinations will be found in the *Pharmaceutical Journal* for July 28, p. 77.

Report on the Materia Medica Class.

Mr. Holmes reported on the competition for the materia medica prizes as follows, and mentioned that the gentleman who came next to the prize winner and so closely that he was only one mark short, was Mr. Mander, whose name appeared in some of his colleagues' reports, and who was fairly entitled to be mentioned.

[Five months' course.]

Bronze Medal ....Lewis Ough.

[Ten months' course.]

Silver Medal.....William Appleton Salter.

The President then presented the above prizes to such of the candidates as were present, and also the books presented by Mr. Hanbury to the winners of the silver medals.

The Council Examination Prizes.

The President then stated the object and scope of the examinations for the Pereira and Society's Medals, and announced the result as follows, the first candidate having obtained 700 out of 1000 possible marks, and the other two having obtained over 600.

I. PEREIRA MEDAL (SILVER); and Books value £5 presented by Mr. T. H. Hills.

William Appleton Salter.

II. PHARMACEUTICAL SOCIETY'S MEDAL (SILVER); and Books value £3, presented by Mr. T. H. Hills.

Edmund White.

III. PHARMACEUTICAL SOCIETY'S MEDAL (BRONZE); and Books value £2, presented by Mr. T. H. Hills.

James John Davies.

The questions set at this examination will be found in the *Pharmaceutical Journal* for July 28, p. 75.

The Jacob Bell Memorial Scholarships and the Redwood Scholarship.

The President then explained the circumstances attending the foundation of the Redwood Scholarship, in honour of Professor Redwood, who succeeded in that building the first professor of chemistry, Mr. Fownes. He might mention that the Society's original chemical laboratory was the first established in London for the teaching of chemistry. He called upon Mr. Tanner, one of the examiners, to report on the result of the examination.

Mr. Tanner said the examination took place in July last at various centres, and there were twenty-six candidates. The standard attained was a high one, 27 per cent. of the candidates having obtained sufficient marks to entitle them to one or other of the awards. Many of the papers gave evidence of very considerable ability, and almost all showed an intelligent appreciation of the nature of the questions set.

The questions set at this examination will be

found in the *Pharmaceutical Journal* for July 14, p. 28.

Bell Scholars. { Harry Dixon Fuge, Newcastle, Staffs.
Richard Henry Norman, Cottenham.

Redwood Scholar...William T. Jones, Wellington.

The President then handed to each of the Bell Scholars books to the value of £2 10*s.* 0*d.*, provided by Mr. T. H. Hills in memory of Jacob Bell, and to the Redwood Scholar a copy of 'Pharmacographia,' presented by Emeritus Professor Redwood and containing his autograph.

The Inaugural Sessional Address.

The President then called upon Sir Henry E. Roscoe, M.P., F.R.S., etc., to deliver an address, which will be found at p. 265.

At the conclusion of the Address—

Emeritus-Professor Redwood proposed a vote of thanks to Sir Henry Roscoe for the very able discourse he had delivered. All present would agree with him that on no similar occasion had they been addressed with so much power and effect. This address was in every way calculated to impress on the rising generation, as well as on those who had long been labouring in the domain of pharmacy, the importance of carrying out education in the most efficient manner. They had had brought before them the long experience of a most able teacher and of a practised examiner, and they were much indebted to him, not only for his kind words with regard to what had already been accomplished, but also for indicating so clearly what still remained to be done in future.

Sir Frederick Abel, C.B., in seconding the motion, said he was not a member of the Society either by examination or honorary, but he had from time to time been an interested participator in its proceedings, sometimes of an instructive and sometimes of a more convivial nature, but on no occasion had he been more thoroughly interested and gratified than on the present. He himself had been a teacher, and also an examiner, though he did not examine young men who were to make pills and mixtures for curative purposes, but young men who were destined to deal out big pills filled with mixtures of the most destructive character. He sympathized most cordially with what Sir H. Roscoe had said on the subject of examinations, which he had been glad to see were so enthusiastically received in all quarters, and he was sure that his words of wise counsel would lead to much ultimate benefit. He only wished Sir Henry could introduce some system of examination into the Houses of Parliament.

Sir Dyce Duckworth, in supporting the motion, said he had a lively recollection of a similar occasion last year, when the words he then uttered brought upon him threats of three actions at law. However, that had all passed away, and he had been able with perfect serenity to listen to the words of wisdom which had come to them from the north. He agreed with all those remarks. He spoke as an examiner in medicine in several universities and in the metropolis, and in that capacity his efforts had always been directed to discomfiting crammers and their products. This was not very difficult to accomplish, especially if care were taken to make the examinations thoroughly practical. He very much sympathized with what Sir Henry Roscoe had said with regard to examiners themselves, and he was satisfied that the best system would be obtained by combining the teacher of the pupil with a perfectly independent outside examiner. He believed such a system was fairest to the candidate and perfectly safe to the public. Any bias which the teacher might have would be neutralized by the utter independence of his coadjutor, who ought not to be a rival teacher, who ought not in fact to reside in the same place, who should know nothing of the candidates who came before him, but should examine a mere number or motto—such a man, combined with the one who had taught the pupil and knew his strong and weak points, would constitute the fairest examining board. He also entirely concurred in the view that examinations themselves were relatively of small importance, the great point being the training and teaching, and he was fully convinced that institutions which were merely examining boards, which had no sentiment, no bowels, and commanded no sympathy from those who came before them, were not the best institutions. He believed in a teaching as well as an examining institution, and therefore he looked forward to the establishment in London of a teaching university, in which education would perhaps be the chief academic element, and the examinations a less important one.

Mr. Crookes (President of the Chemical Society) said he had only just returned from his holiday, and had hardly recovered a sufficiently scientific frame of mind to take part in such proceedings. He had been climbing mountains, and he thought the object he had in doing so was very similar to that which actuated the young men before him, to get to the top in the easiest possible manner and with the greatest benefit to himself. Now, if they looked at the top of a mountain when they were at the bottom, it seemed almost hopeless to attempt to reach it; the great thing, he found, was to keep the top in view, but not to look at it too much; to plant one foot very firmly down and be quite certain you had a firm foothold, and then take the next step. That was always very easy, and if you kept on doing that, taking the next step and the next, it was astonishing how soon you got to the top, and what a little effort you expended in doing so. The rule which was good in climbing mountains was equally good in attaining eminence in any branch of science. He had listened with great delight to what Sir Henry Roscoe had said about examinations. For years past he had done all he could to write and speak against the evils of cramming, and he hoped the views which were gradually permeating the educational branches of society would introduce some new system which would obviate those evils. It was a great pleasure to know that a man who had devoted the greater part of his life to science had now become a legislator, and was trying to ameliorate the evils which the examination system had done so much to introduce.

Dr. Lauder Brunton said he afforded in his own person an example of two of the evils which Sir Henry Roscoe had condemned, examination apart from teaching, and the want of schedules. When he was a student he went in for an examination in seven subjects, four of which he had studied fairly, having spent a year or a year and a half upon them, and the other three he got up in ten days.

At the end of ten days he was mightily astounded to find how much a man could cram up in that time, but a week after the examination he was still more astounded, for he had previously no idea how much a man could forget in a week. He discovered then that an examination was no test whatever of real knowledge ; to get that you must have a real system of training, and if that were thoroughly carried out it was much better than any amount of examination. Secondly, as to the schedules, it was his duty for a number of years to examine in a certain institution in materia medica, and it was the recognized thing to examine the candidates, not only in that subject, but in therapeutics. He found that he had to ask lots of men about the treatment of diseases who did not know the names of the diseases. It struck him that this was a very wrong thing, and he conferred with his fellow-examiner, who was of the same opinion. They thought the matter should be brought before the authorities of the institution, and consulted one of the permanent officials. He suggested that they should themselves investigate the records, since it might not be necessary to refer to the authorities, and on looking into the matter they found that for twenty years men had been examined in therapeutics without any reason for it. When he discovered that he thought what an awful shame it was that he had been examining these unfortunate men unnecessarily, and it was all due to the want of a schedule. If these men had known the truth they would have been as angry as poor Matthew Mears. He did not know whether they knew the history of that individual, but it was this : –

> "There was a man in our town,
> His name was Matthew Mears ;
> He wound his clock up every night
> For six and forty years ;
> And when this precious timepiece proved
> An eight day clock to be,
> A madder man than Matthew Mears
> You would not want to see."

He thought if he and his fellow examiner could have had ranged before them all those poor students who had been grinding up therapeutics as well as materia medica without knowing the names of the diseases for all those twenty years they would have had a bad time of it. He cordially supported the vote of thanks to their candid friend for pointing out these abuses.

The motion having been carried unanimously,

Sir Henry Roscoe said it was particularly gratifying to him to have to return thanks, not only to all the kind friends present, but especially to his venerable friend Professor Redwood, to whom he had the honour and pleasure of being introduced about forty years ago in old Mr. Morson's shop in southampton Row. It was also very pleasing to be able to congratulate him on this first occasion of the presentation of the Redwood Scholarship, and he felt sure that the young man who had gained that scholarship, and all those who would follow him, would have a distinguished career, because they would always bear in mind the name they bore as Redwood scholars, and would tread in the steps of their old friend, whom they had great pleasure in seeing there so well and full of vigour on this occasion. Sir Frederick Abel had said he wished members of Parliament could be examined. He could only say that if ever Sir Frederick stood for parliament—and he hoped he would, say, for Woolwich—he would find out then whether they were examined or not. Speaking for himself, he knew that he had been pretty well heckled, but he had no doubt that if Sir Frederick Abel took that position he would come off with flying colours. He also thanked his friend Dr. Brunton for the very forcible exposition he had given of his remarks, which would have fallen very flat but for the practical illustration he had given of the truth of the arguments that had been adduced. He might say that anything he could do or had done to help forward the cause of pharmaceutical education had been and would be done with the greatest pleasure.

The Bentley Testimonial.

The President said there was still a very interesting ceremony to perform, namely, to give a report of certain proceedings which had resulted in the Bentley Testimonial. Professor Bentley, like Professor Redwood, had after nearly forty years teaching found it necessary to retire, and some of his old pupils and friends had desired to present him with a little testimonial. This had assumed the form of a portrait and a purse, and he would ask Mr. Plowman, the Secretary and Treasurer, to state more fully the result.

Mr. Sidney Plowman said for some time past he had been intimately connected with the movement having for its object to present Professor Bentley with a testimonial on his retirement from the chair of Materia Medica and Botany in the Society's school. He was glad to be able to report that this movement had been a complete success, and it was his duty as Treasurer and Secretary to request the President to accept on behalf of the Society a portrait in oils, by Mr. Arthur J. Foster, of their old teacher and friend, which was now in the new examination hall for the inspection of the members and subscribers, and further to ask him to present Professor Bentley with a purse of 300 guineas as a mark of personal esteem towards himself.

The President said on behalf of the Society he begged to thank the subscribers for the gift of the portrait, and to say on the part of his colleagues on the Council that they would be pleased to place it on the walls of the institution side by side with those of other distinguished men. As one of Professor Bentley's old pupils, and as President of the Society, he had been honoured with the position of Chairman of the Testimonial Fund, and as such he had the great privilege of handing him the purse containing the sum mentioned by Mr. Plowman. It did not represent in point of money anything like the amount of respect, admiration and affection which every one of his pupils entertained towards him ; it was simply a representation in tangible form of what many others besides the subscribers felt with regard to him. He might congratulate Professor Bentley on the fact that from every one of the subscribers had been received such words of congratulation and affection as he might well be proud of. He would only express the hope that relief from professional duty would be the means of restoring him to complete health and that for many years to come he might live in personal and actual friendship with his old pupils. When in the inevitable course of things that was no longer possible, his portrait on the walls of the Institution would still perpetuate the memory of Robert Bentley.

Professor BENTLEY, in reply, said the very kind and flattering words with which the President had accompanied this testimonial, and the enthusiastic manner in which they had been received entirely overcame him, and he should fail entirely to express what he felt on this occasion. When the heart was full the voice was like the turbulent waters of a confined stream, very agitated, and it flowed very irregularly. That evening recalled vividly to his mind a similar occasion many years since—nearly half a century—when he was called upon by the first President, William Allen, to receive the prize in botany, the first ever given in that institution. He had always looked back with pleasure to that occasion, and he was quite sure that those who had received prizes that evening would understand him when he said that that event had a material effect on his future career. From 1842 to 1849, though intimately connected with pharmacy, he had no official position there, but in 1849 his old teacher, Dr. Anthony Thomson, asked him to give his course of lectures for him, and at the conclusion of the session he had the honour of being appointed Professor of Botany. Three years after, in 1852, he had the distinguished honour of succeeding his revered and honoured teacher, Dr. Jonathan Pereira, in the chair of Materia Medica, and from that time up to last year he had the responsible duties of the Professorship of Botany and Materia Medica. He was fully sensible of his many shortcomings, bnt he could say most thoroughly that throughout the whole of that time he was always in happy harmony with the Council, the officials, and his colleagues. It was a great satisfaction to him to know that many men distinguished as pharmacists, as scientific investigators and teachers, had been his pupils. As to the rank and file, of whom the President had spoken so fully that evening, he could say conscientiously that he had endeavoured to do his duty, to teach them to the best of his ability, and to make friends of them. It was now his satisfaction wherever he went, and he had gone about a great deal lately, in any town or village, if he did not meet old pupils he met pharmacists, and from pupils and pharmacists alike he always received courtesy, kindness, and every attention he could wish. He esteemed it a very high honour that his portrait should be hung side by side with the very distinguished past President's colleagues and others of his friends, whose portraits now graced the walls. He believed the portrait was of high artistic merit and would meet with general approval. As to the supplemental testimonial which had been so kindly given him, he was so overpowered by the munificence of the gift that he was quite unable to express his feelings. He thanked the President and his old and distinguished pupil, Mr. Plowman, for the energy he must have devoted to the matter, and he thanked all the subscribers. The past was gone and the future was before him. In that future he could safely say that whatever pain he might be called upon to suffer, his greatest solace would be the remembrance of the happy days which he had passed with his pupils and associates in that institution.

The company then adjourned for refreshments to the new examination hall, where an opportunity was also afforded of seeing the portrait of Professor Bentley just presented to the Society.

Pharmaceutical Society of Ireland.

ANNUAL GENERAL MEETING.

On Monday evening, October 1, the annual general meeting of the members of the above Society was held at the rooms, 17, Harcourt Street, Dublin, at half past seven o'clock.

The chair was taken by the President, Mr. James E. Brunker, M.A.

The other members of Council present were the Vice-President, Mr. Draper, Dr. Collins, Dr. Montgomery, Messrs. Hayes, Simpson, Grindley, Allen, McCormack, Beggs, Charles Evans, Wells, Hodgson (Treasurer) and Professor Tichborne. The members of the Society who attended were Messrs. P. Merrin, P. Kelly, R. I. Downes, A. Paterson, Bower, John Evans, Thos. Batt, I. S. Holmes, H. Boyers, Edward, McCreery, Hill, E. W. Bell and John A. Ray.

The Registrar, Mr. Arthur Ferrall, read the minutes of the last annual meeting, which were confirmed.

The President said the first business was the appointment of scrutineers of the ballot for an election to fill vacancies caused by outgoing members of the Council.

On the motion of Mr. Simpson, seconded by Mr. Downes, Messrs. Paterson, Wells and Kelly were appointed scrutineers. While they were performing their duty in an adjoining room,—

The President mentioned that up to the present time the Society had no materia medica specimens for the examiners to use at the examinations for the License. The examiners had suggested that a collection of such specimens should be made, and it was desirable that members should supply for the use of the museum any specimens that might appear to them to be suitable for examination purposes. The Vice-President had undertaken the task of supplying the necessary bottles.

The Vice-President said that by direction of the Council, Mr. Allen and himself had taken the last-mentioned matter in charge. About one hundred and forty specimens were wanted. An order for suitable bottles had been given to the York Glass Bottle Company; and if seven members of the Council or of the Society would contribute twenty specimens each a nice collection could be made up. He would undertake to supply twenty specimens himself.

Mr. Hodgson, Mr. Allen and other gentlemen also undertook to assist in the matter.

Elections to the Council.

The scrutineers having reported,

The President announced that the ballot had resulted in the election to the Council of the following gentlemen:—Dr. Whitla (Belfast), 58 votes; Mr. Beggs (Dublin), 51; Sir George Owens, M.D. (Dublin), 50; Dr. Montgomery (Dublin), 47; Mr. Minchin, 47; Mr. Merrin, 37; and Dr. Whitaker (Belfast), 36.

The President declared the above named gentlemen duly elected. Mr. Hill, who was also a candidate, received 26 votes and Mr. Ray 3 votes.

The President's Address.

The President: Gentlemen, it is my duty now to give an account of my stewardship for the past year. I think that taking into account the position in which we stood this time twelve months and our position now, we have made some advances. I shall first deal with the examinations, which continue to increase in efficiency, whilst the number of candidates who presented themselves this year shows an increase upon the preceding years. We examined during the year at the Preliminary examination fifty-five candidates, as against forty-two last year. It is a very healthy sign to see such a number of young men presenting themselves at the Preliminary examination; and taking into account the fact that fully one-third, or perhaps more,

of the men who afterwards present themselves for the licence have not passed our Preliminary examination, but some other which we accept as equivalent to it, we may take it for granted that the number of those who will in future present themselves for the licence will show a very considerable increase. For the licence we examined during the year forty-two candidates as against forty in the preceding year. This examination shows one very satisfactory feature, namely, that of those whom we examined this year only 38 per cent. failed, whereas in the previous year 50 per cent. failed. That appears to indicate that the young men coming to us are better and more practically educated and better able to satisfy the examiners than before. When we take this in connection with the fact that our examination is improving in efficiency, and that the newly-made regulations are now in force, we may be satisfied that the young men whom we are licensing as licentiates of the Society are likely to prove a credit to us in future. Our membership does not show any very decided advance. Last year, you may remember, we had a slight increase as compared with the year before; this year we have sixty-four subscribing members as against sixty-two last year. We have now on our roll, including original and life members and subscribing members, 80 members; so that when we are told that we are a very small Society and very insignificant members of the community, I think on the contrary that eighty educated men, such as our licentiates may be safely said to be, form a rather important item of the community. The changes in the Preliminary examination which were recommended last year, having been approved of by the Privy Council, have come into force and will ensure that the young men who are going to our profession, before they commence at all, will be in a position, from their Preliminary training, to take full advantage of the instruction they receive from their masters and at the schools that they attend. Practical chemistry is now much more extensive than it was when we first introduced a mild form of curriculum requiring attendance at a three months' course. We found that the actual attendance at the work of the school was scarcely sufficient to justify a young man in saying that he was conversant with practical chemistry. We now require 100 working hours; and in the percentage of candidates who have passed you have a practical illustration of the advantage of the change in the system of instruction. We have not done much in the way of prosecuting offenders against the Pharmacy Act, and what we have done has not been very satisfactory. We had only one case in Dublin, which should have succeeded; but, owing to circumstances over which our counsel had no control, it proved a complete failure. In the north of Ireland there was a successful prosecution at Cootehill, while another case at Ballybay proved a total failure. The Council have taken steps to have the decision of the magistrates, which was a grotesquely absurd one, revised; and before very long I think you will hear of those cases being reopened. The main efforts of the Council during the past year have been directed to getting some change in the law. You may remember that this time last year it was announced to you, that as the Government had refused to take any steps in the way of amending our very defective Act, we had undertaken to do so ourselves. The first step was to ascertain whether any Member of Parliament would undertake to introduce a Bill for us. On applying to the Earl of Milltown, we found that he was ready to take up a Bill for us; and I must say from my experience of him that I think the Council and the Society are under the deepest obligation to him for the part that he has taken in this matter. He threw himself most ardently into it, and has gone through an enormous amount of real hard work, and if it were not for him, we could not possibly have been in the position that we are at the present moment with regard to our Bill. As soon as he announced that he would undertake the Bill, we put ourselves into the hands of Messrs. Clay and Close, very successful and clever parliamentary agents, who have worked most ardently for us. Their aid too has been invaluable. There is no use now in detailing to you all the steps through which the Bill has gone; but I will just recall a sentence that I used myself at the annual meeting last year. I said—"Gentlemen should remember that if they went to parliament they could not expect to have everything their own way, they should be prepared to encounter opposing interests." Well, we have not had everything our own way; but still, looking at the Bill as it is now printed, it far exceeds anything we expected to arrive at in the course of the session. The fact of our Bill having been brought before a Select Committee of the House of Lords—the most business-like tribunal that a business matter can be brought before—has been largely in our favour. The evidence adduced on the part of the Society was ample for our purposes, and appeared to carry the Committee with us. On the other hand, the evidence of our opponents was most contradictory. The witnesses contradicted themselves and one another so that the nett result of the evidence before the Committee was to leave the case of the Society quite unshaken. There were certain amendments proposed which the representatives of our Council very gladly accepted, as tending to show that they were unwilling to press unduly for any monopolies that they were supposed to wish for. But, on the whole, they have been able to keep the Bill on the lines on which it was originally drawn; and the only stage it has now to pass is the Committee stage of the House of Commons, for which the 14th of November is fixed. When that time comes some amendments may be proposed, but we will be able to carry the Bill practically through in its present shape. You are all familiar with the Bill as it stands, and will see where we were unable to carry out ideas which we would gladly have given effect to. For instance, as regards co-operative stores, we were informed that either in the Lords or the Commons any such clause as we proposed—and it was a very stringent one—would have been scouted out of the House, and perhaps our Bill along with it. It was necessary, therefore, to withdraw that clause. The principles of the Bill are mainly two. One is to compel druggists whose rights are preserved by section 31 of the original Act to come in and register. The second main principle of the Bill is to close the door from a certain date against all persons. The list of persons to whom we originally intended to extend that right has been a good deal enlarged during the progress of the Bill; but I think we have strengthened our position very much by affording an opportunity to everyone who by any courtesy could claim to be registered as a druggist up to the present date, and thus we shall be in a better position to fight the principle of closing the door from henceforth against others. A very large number—some hundreds—will be entitled to register under these clauses. The result will be that the wants of the country, continually dinned into our ears by our opponents, will be fully supplied for many years to come. Many persons, who are now apprentices, may, in a healthy country like this, have a long career; and by the time that they have died out the Society will be able to fill their places with fully qualified pharmaceutical chemists. The attention of the Council has been so much taken up with this Bill during the year, that there are many things which we have not been able to touch at all. We have got through the year's hard work without any very great inroad on our funds; and the Treasurer will lay before you a very satisfactory state of things in that respect.

Mr. Downes said he wished to refer to the evidence

given before the House of Lords on behalf of the Society. Three representatives of the Council gave their evidence before the Select Committee, and a resolution of thanks was afterwards passed to them. With regard to the evidence of the President and that of Mr. Allen, he had not the slightest hesitation in saying that in general they were fair statement, fair argument, and fair inference; and, although he might differ with them in matters that he was not going to discuss now, he was perfectly satisfied with the tone of their evidence. But when he considered Mr. Hayes's evidence, he had a different story to tell. He (Mr. Downes) had no possible object in increasing or provoking animosity; but if he were to allow Mr. Hayes's statements before the Committee to go unchallenged, he should place himself in a false position, and not be worthy of the position he hoped to occupy before the Society. In discussing the matter he had considerable difficulty in expressing himself so as to to keep his words within his feelings. His feelings were very strong on reading the evidence; and as the report of it, which appeared in the *British and Colonial Druggist*, was not official, he had procured a copy of Hansard. He saw in it what seemed to be an error in Mr. Hayes's evidence, but that gentleman could correct it; but as they had both received their evidence to correct, he assumed that what he had before him was correct. As regarded the manner in which he had represented that Society, if they looked at questions 457, 458, 459, and 460 they would find the animus which he suggested that the Council had, and what the chemists and druggists might expect when they came up for examination. He represented there, that if there should be an examination for chemists and druggists, it would be the same, or practically nearly as severe, as that for pharmaceutical chemists. That was the sort of treatment that chemists and druggists were to expect when they came to a modified examination. At no. 475 he was asked a general question, and he said that he had heard the evidence on Friday, and that he had made notes of the objections to the Bill. His observations from that point required 129 questions from the Committee, to endeavour to show him the difficulty of getting intelligible and reliable evidence from him, according to his (Mr. Downes's) view of the case. As to the President's evidence, it only amounted to 122 questions. At question 479 Mr. Hayes was asked the number of old chemists and druggists trading in Dublin, and said he knew of but two, and in answer to question 480 he repeated that statement. Perhaps he would be surprised to know that he (Mr. Downes) could name 13 at the present day. When he came to 506, he found a series of statements which he hardly liked to characterize; he was astonished that they should come from a gentleman of Mr. Hayes's standing. The speaker referred to another statement in the evidence, and proceeded—He (Mr. Downes) must say that that came to him almost like a deliberate——

Mr. Wells: I rise to order. We have come here to transact certain business on the agenda paper, but this appears to be an attack on Mr. Hayes, and I think it is outside the scope of our business. I ask you to rule if Mr. Downes is in order. I have to go away at a certain hour, and I think it very hard that our time should be taken up with a personal matter.

The Vice-President: I think, sir, that you had better let Mr. Downes go on. I am sure that Mr. Hayes does not feel this in the very least. He is quite above insinuations.

The President: A point of order has been raised, and I must rule on it. The course of proceeding is, that if anything arises out of the President's address with reference to what has gone on during the past year, or to the proceedings of the Council, it is subject to discussion. But the question as to what evidence was given by any individual before the Select Committee is, I think, quite outside the course of our procedure to-night. I am very sorry, indeed, to stop Mr. Downes in making any complaint that he wishes to make; but as the point of order has been raised, I must say that I do not think his remarks hitherto are in order. Any other matter that he wishes to refer to, arising out of the proceedings of the past year, we will be happy to hear.

Mr. Downes: I bow to your ruling; but my position is that this evidence was given in the name and on behalf of the Society, and received the sanction of the Council through a vote of thanks, and I consider that I am perfectly justified in entering a protest against it and defending myself.

The President: There were many sources open to you of contradicting the evidence.

Mr. Downes: It was given behind my back, and I do not see any other way of challenging it.

Mr. Allen: You could have been there, Mr. Downes.

Mr. Hodgson, the Treasurer, then made his statement for the year. The figures, he said, differed only slightly from those of last year. They left off almost the same as they did last year, although there had been a little exceptional expense. They had received fees for 28 examinations for the license, as against 25 last year, and for 53 preliminary examinations, as against 47. They received altogether £273 10*s.* 6*d.* for examinations one way or another, including re-examinations. In subscriptions there was a falling off, but it was only apparent. Last year, Mr. Ferrall looked after the subscriptions, some of which were in arrear and some omitted or forgotten by the subscribers, and he managed to raise the subscriptions to £72 in that year. This year they had only received in money payments £60, although there were 64 subscribers, but some subscriptions had come in since the account was closed. They had virtually received in cash subscriptions £63 during the year. They commenced the year with a balance in the bank of £126 17*s.* 10*d.*, and their income for the year had been £475 13*s.* 2*d.* They had spent in fees to their examiners £92 18*s.* 6*d.*, as against £86 2*s.* 0*d.* last year. For reporting, the amount paid was fifteen guineas, or nearly that—a standard sum.

The President: We had some special meetings this year.

Mr. Hodgson, in continuation, said a guinea had been paid for the reporting of each of fifteen meetings. Salaries and extra work came to £65; rent was a stationary item—£50; and printing cost very much the same as last year, namely £39. Law expenses were a little heavier than usual, but these were principally caused by the visits of the deputation to London, in connection with the Bill before Parliament, and were very necessary. Sundries amounted to a little more than last year. They had had to pay Messrs. Hodges and Son for gas and water fittings of the examination room £13. The total for sundries, including postage, &c., was £43 14*s.* 3*d.*, the item being rather larger than usual, in consequence of the correspondence connected with the Bill. These items, deducted from their income, left a balance in the Bank of Ireland of £123 10*s.* 11*d.*, which exactly corresponded with the book he kept of the expenditure. The amount of stock in bank was the same as last year, viz., £248 3*s.* 1*d.* So that the money capital of the Society on the 1st October, 1888, was £371 14*s.* The account had been vouched by the auditors, Messrs. Hayes and Simpson. There was one item that did not appear in the account, namely £20 for the *Pharmaceutical Journal*. The reason of that was that the account for it had not been furnished; but the money was due, and would have to be paid.

A Member asked how much did the visits to London cost?

The President: The total cost was £29 6*s.*

The Vice-President: And very cheap at the money.

The President: Besides that we received from Government, by order of the Select Committee, five guineas each—Mr. Allen, Mr. Hayes, and myself. I paid three visits to London.

Mr. Hodgson: As the question has been asked about the law expenses, I will give details, viz.:—Balance due to Messrs. Ennis and Son, £9 17*s.* 6*d.*; five guineas to Mr. Oldham for law proceedings; 14*s.* 8*d.* paid for something by the Registrar; and Messrs. Brunker, Allen, and Hayes' expenses to London, £29 6*s.*,—making a total of £45 3*s.* 2*d.*

On the motion of Mr. Holmes, seconded by Mr. Boyers, the statement of the Treasurer was adopted.

The remainder of the report had not been received at the time of going to press.

Obituary.

The Pharmaceutical Society has lost another of its old members by the death, at the age of 71, of Mr. William Markham Colchester. Although not one of its founders, Mr. Colchester joined the Society shortly after its formation. His first connection with pharmacy was in the year 1832. After having served his apprenticeship at Camden Town and at Greenwich, he then, in 1836, became assistant to his predecessor, Mr. Southerden, of Old Street Road, of whom he eventually purchased the business in 1838,—just fifty years ago. This he carried on for ten years, during which time he commenced the manufacture of the various concentrated preparations which have made his name familiar; and in 1848 he confined his attention solely to the wholesale branch, relinquishing the retail, and taking the adjoining premises. He may be considered the pioneer of some preparations now to be found in the pages of the Pharmacopœia, his preparations of senna and secale being amongst his earliest introductions. Mr. Colchester left business as usual on Saturday (September 22), and when about retiring to rest, suddenly complained of acute pain in the region of the heart, syncope rapidly followed, and he passed peacefully away in about an hour after the commencement of the attack.

Notice has been received also of the death of the following:—

On the 26th of September, Mr. John Freeland, Pharmaceutical Chemist, Bathgate, N.B. Aged 61 years. Mr. Freeland had been a Member of the Pharmaceutical Society since 1853.

On the 26th of September, Mr. Thomas Jones Hunt, Chemist and Druggist, Southgate Street, Gloucester. Aged 50 years.

On the 28th of September, Mr. Robert Knott, Chemist and Druggist, Blackburn Road, Bolton. Aged 64.

On the 28th of September, Mr. John Tunley, Pharmaceutical Chemist, High Street, West Bromwich. Aged 77 years. Mr. Tunley was a Founder of the Pharmaceutical Society, having been a Member since 1842.

On the 30th of September, Mr. Frederick Comerford Marks, Chemist and Druggist, Market Place, Wantage, Aged 38 years.

On the 30th of September, Mr. Thomas Hindle Sykes, Chemist and Druggist, Lord Street, Stockport. Aged 60 years.

BOOKS RECEIVED.

THE ART OF DISPENSING: a Treatise on the Methods and Processes involved in Compounding Medical Prescriptions. London: Office of the *Chemist and Druggist*. 1888. From the Publishers.

GUIDE BOOK FOR DISTILLERS AND MANUFACTURERS OF ARRACK, COGNAC, GIN, RUM, CORDIALS, LIQUEURS, etc. By E. SACHSSE and Co. Leipzig. 1888. From the Authors.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

GERMAN ASSISTANTS IN ITALY.

Sir,—The perusal of two communications on the subject of English Assistants on the Continent in the *Pharmaceutical Journal* of September 22 last has made it evident that a tender spot was touched when I set forth my personal experience of German assistants in a letter written to the President of the late Pharmaceutical Conference, some paragraphs of which were read to the meeting at Bath. Naturally, the first thing I did was to refer to the offending quotations, just to see whether I was really deserving such a large amount of closely printed comment. But I failed to detect the "severe remarks" on English assistants in the statement that in some respects, especially in languages, Germans were superior to my own countrymen, giving that as a reason why they were employed in my pharmacy. The other remark referred to the probable state of a Minor man a year after his passing or squeezing through "the Square," setting forth my doubts as to his ability in analysis at that period. I regret that my mode of expressing my convictions should not have been to the taste of your two correspondents, and I feel grateful to an assistant from the Riviera in pointing me out what I ought to have written, which should have been, "regret that pharmacy in England is so far behind the close pharmacy of the Continent." What! he complains of my comments on English assistants and then puts these words into my mouth; which seem to me to be a simple admission that, after all, we are a little behind in England in some things appertaining to our profession. Further on he writes, "and blame is due to the system and not to the men." Just so, we both agree most fully in this particular; but I should like to know where he finds that I have attacked the man except as the personification of a system. I am sufficiently patriotic myself to favour all I can my own countrymen, but the experience I have acquired since I was a "young Briton" has sufficed to convince me that I know the requirements of my own business better than anyone can tell me. To my judgment the question resolves itself into this simple fact, that in an international pharmacy, where one has to speak promiscuously four languages, a man who can do so is a much better one than he who cannot. Do we not follow the same system for which I am censured in England itself? How about the appointments of Panizzi, Hofmann, Max Müller and others, to big trusts, simply because they were found to be the fittest? Yet they were all foreigners.

I am fully aware of the existence of Assistants' Associations in England, and am very proud of their proceedings, which I have helped by contributing a paper to one of them. This shows, at all events, I have no bias against my countrymen, such as the tone of these letters would almost lead one to suppose. These assistants would certainly hold their own against any, but the lack of languages puts them out of our sphere. Judging from the remarks of "Riviera," I fear his experience of German assistants is a limited one, confined perhaps to the individual of 20 he describes, who cannot have passed his full examinations. He goes out of his way to describe how these pharmaceutical Teutons filter down to us in Italy, and the description is decidedly interesting. The first force that impels them seems to be the military system of the fatherland, fleeing from which they arrive in Switzerland, that country of so many languages, when after a year they become the possessors of tongues. I should like to know how many tongues your correspondent could acquire in a year. Then they go on to France and later on to some town in Italy. The decimal system seems to have aided them considerably, and they still keep marching on. Why the decimal system should be so potent in international work I cannot say, as it is not yet adopted by all nations, and the value of the grain, which we find so frequently on prescriptions, unlike the gram, differs very considerably, and it is this that should be well studied by an international man. There is one thing, however, which represents the decimal system and has a won-

derful motive power, I allude to the "Pièce de Cent Sous;" it is this perhaps which enables these "young fellows about twenty," described as very experienced men, to land themselves eventually in my pharmacy, where they find in "a little work and a cigarette" their reward for their former peregrinations. To "Riviera's" experience let me append mine, which has the merit of extending over some years. Unfortunately I do uot find that the class of assistants I require filter down iuto Italy so readily, as I have always had to pay their fares. They have never been less than twenty-three or twenty-four years of age, have gone through their military instruction as well as the whole of their examinations. They have invariably acquired the confidence of both medical men and customers, come with a good idea of international pharmacy, and are quick and capable workers who never want to pick their work but go in at it "from the shoulder." With the exception of one they wrote very fair labels. This is my experience of German assistants, three of whom I am happy to say are doing well iu interuational pharmacies of their own. It is eminently satisfactory to hear that the Riviera assistant, having often talked over the question of assistants with his *confrères*, has come to the couclusion that the English standard is rarely reached by others. I wonder how a similar discussion amougst Frenchmen or Germans would end? I expect according to their natioual colours; they would each vote themselves the best of "jolly good fellows." Your correspondents must therefore allow people to be the best judges of their own particular wants, and avoid importing any national love or hatred iuto a purely business question. Your other correspondent, Mr. R. E. V. John, who is also very kind in pointing out what I should have written, thinks he has discovered the reason why German assistants are so much employed, in supposing that they are willing to take smaller salaries. This, however, is not the case. The pay they get from me would be considered handsome anywhere, and to this is added a month's holiday during the year. The class of "young fellows about twenty" would decidedly get less and deserve it. As a salve to heal the sores of your correspondents I will remark that our countrymen have, as a rule, a much better idea of business and book-keeping than their German *confrères*. Mr. R. E. V. John, who is evideutly indignant at my standing in the solitary and peculiar position of a person who finds it most convenient to his requirements to employ Germans, will be glad to hear that the spell which had bound me has been broken, and I have a Swiss gentlemau, alas! a Germau Swiss, a Ph.D. and magister of pharmacy, who is coming in a few days. Furthermore, I may tell him that my staff of polyglots being sufficient to relieve me from constant attendance at the pharmacy, I should certainly employ an Englishman in the event of requiring more aid. I will now conclude this lengthy letter by observing that I shall not reply to any further comments on the subject of assistants, be they English or German, as I am perfectly satisfied that I have done no harm to either. HENRY GROVES.

DETERMINATION OF MELTING POINTS.

Sir,—In your issue of September 29, Mr. Thomas S. Dymond writes to point out what he considers a source of error in the methods for the determination of melting points given on page 205, and he is kind enough to apply a correction which very conveniently makes some figures approximate more closely to what doubtless is the true melting point of stearic acid. Unfortuuately he does not let me know, for my future guidance, his method of calculating the correction, and I am quite at a loss to understand how he arrived at his result, seeing he did not possess what are usually considered necessary data, namely, the temperature and length iu degrees of that portion of the stem of the thermometer exposed to the cooling effects of the air. I can only suppose that he guessed these and guessed wrong.

Mr. Dymond appears to have confused two methods. The figures he takes exception to were given as showing the degree of accuracy which may be expected by a process which gives results confessedly below the truth. The thermometers used ranged from 0° to 50° C. and from 50° to 100° C. In the case of stearic acid only 8·5° C. was exposed outside the cork of the test tube which formed the hot air bath. The correction necessary was calculated and found to be much nearer 0·08° C. than 0·58° C., as Mr. Dymond calculates, and as the process was only mentioned as a rough and ready one the correction was not made.

History occasionally repeats itself. Instances of its having done so will occur to most of us. It was said long ago, "there is nothing new under the sun," and Mr. Dymond traces a similarity between Piccard's method of determining melting points and one of those used by me. The capillary tubes are bent U shaped in both processes, but here the similarity ceases. Piccard's tubes are hermetically sealed at the wide end, and the substance is forced up the capillary tube by the expanding air, at a temperature which varies slightly with the size and shape of the tube, the rate of heating, and the amount of air which happens to be imprisoned in the closed portion. Furthermore, as Piccard recommends the air reservoir to be placed just under the surface of the paraffin, a correction is quite as neccssary, but may be avoided by both methods if the tubes are sufficiently long.

10, *Ascham Street, N. W.* W. H. SYMONS.

ENGLISH DISTILLED OIL OF MENTHA ARVENSIS (JAPAN PEPPERMINT).

Sir,—I have only to-day become acquainted through the Journal with the remarks of Mr. Groves and Mr. A. C. Abraham in the discussion on the above at Bath.

The day after the above oil was obtained as detailed in my note read before the Conference, and printed in your last issue, it was examined for menthol by immersion in a freezing mixture. To commence with it was fairly bright; when the temperature had fallen to 40° F. the oil had become quite turbid and opaque, and this appearance remained unaltered down to 20° F. As the temperature rose the turbidity gradually lessened until at 60° it had totally disappeared, and a globule of water had formed at the bottom of the tube. The bright oil, freed from the water, was submitted to similar conditions without the slightest change, though it was kept at 20° F. for some hours.

I intend to repeat the experiment with the same oil some time in the future when menthol may be supposed to have been formed, and will communicate the result.

I am quite of Mr. A. C. Abraham's opinion that this oil approaches the Mitcham oil in softness and character of odour, as it certainly does in specific gravity and boiling point. The conditions under which the plant was grown favour this approximation. It would be interesting to examine into the characters of oil from plants actually grown in a Mitcham peppermint field. *M. arvensis* would give a far richer yield per acre, and if amelioration in quality is recognized a home-grown product would have an opportunity of competing with an import, not merely on the ground of cheapness, but quality. JOHN MOSS.

"VERMIN KILLER."

Sir,—I noticed in the last issue of the Journal an interesting note by Mr. F. Rimmington, of Bradford, relative to native sulphate of baryta as a vermin killer. I do not wish to call in questiou Mr. R.'s statement as to the use of that salt, but I know for a fact of many years experience that native carbonate of baryta is employed as a vermin killer, and although the native sulphate does contain traces of carbonate I presume it was this salt that was meant. The usual directions given with such an exterminator are —that the pests be fed for one or two nights on oatmeal, and then the mixture of meal and baryta carbonate prepared for them, placing near their haunts a shallow vessel of water.

A well-knowu north of Eugland vermin destroyer, containing 2 ounces of this substance, and retailing at a high figure, is extensively used by agriculturists.

Hexham. T. W. ROBSON.

D.C.—(1) *Tussilago Farfara.* (2) *Carduus lanceolatus.* (3) *Scrophularia nodosa.* (4) *Aster species* (not British). (5) *Potentilla Fragariastrum.* (6) *Potentilla reptans.* (7) *Anthemis Cotula.* (8) *Matricaria inodora.*

Eboracus.—Huxley and Martin's 'Course of Elementary Instruction in Practical Biology,' and Parker's 'Zootoma.'

E. H. B.—See P. T. Main's report on the subject in the 'Trausactions' of the British Association for 1887.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Dickson, Towerzey, Willmott, Currey, W. G. G.

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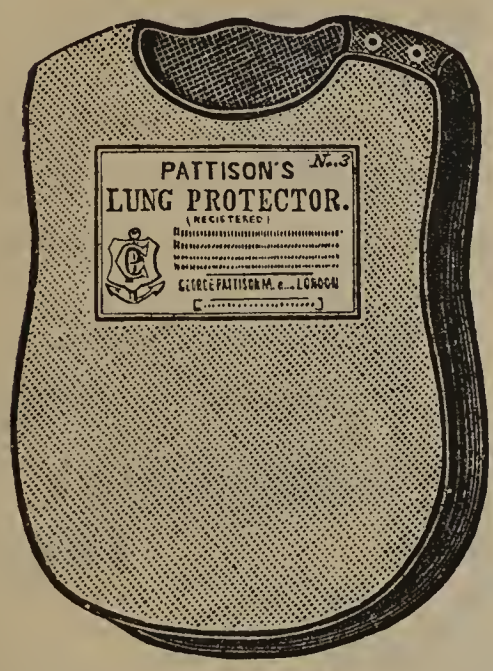

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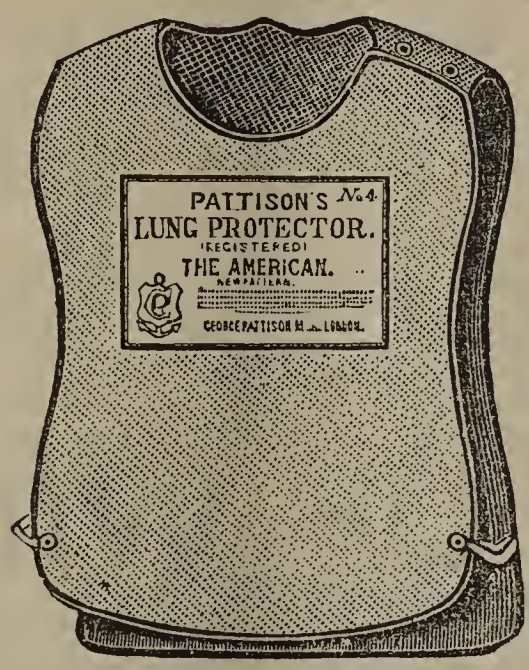

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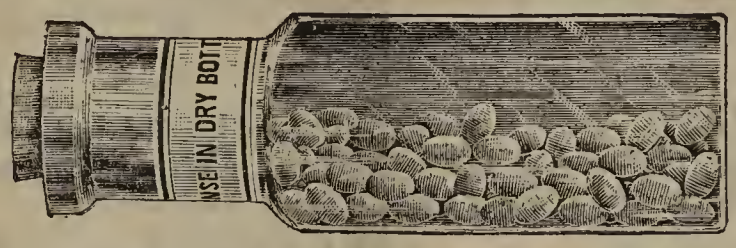
EXACT  SIZE.

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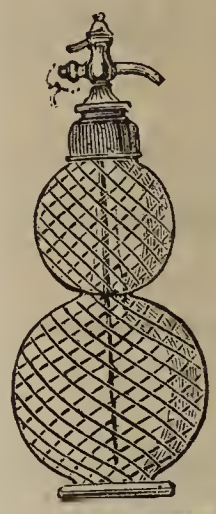

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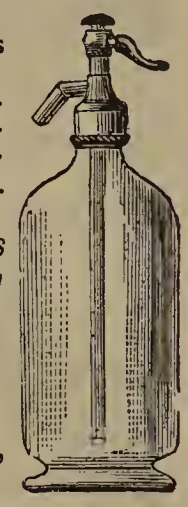

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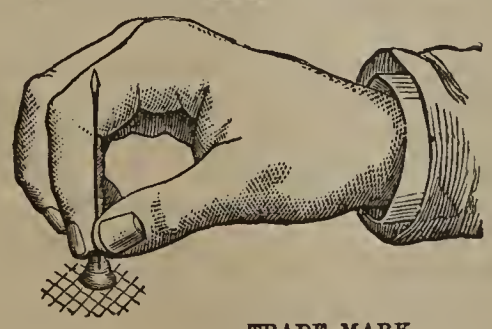

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FEES (FROM OCTOBER 23RD):—

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Until Qualified £12 12 0
12 Months' (Minor and Major) £15 15 0

MAJOR.

To the December Exam..£4 4 0.—February..£7 7 0
Until Qualified £10 10 0

During the past Session, **14** Students passed the Preliminary, **140** the Minor and **12** the Major Examinations of the Pharmaceutical Society.

At the last Pharmaceutical Examinations, **8** Major Candidates from this School presented themselves, **6** passed. The following **35** Minor Students were also successful.

MAJOR.

CARTER, B.	FORSTER, J. B.	WANT, W. P.
EVANS, J.	HEATON, S. W.	WRIGHT, J.

MINOR.

ARDEN, L.	HALL, A. J.	OGLE, J. H.
BAKER, H. W.	HITCHMAN, W.	PATCHETT, J.
BELL, J. H.	HORSLEY, E. S.	PEPPERDINE, H.
BROOKS, J.	JONES, J.	REID, D.
BROWN, L.	JONES, LL.	RUTHERFORD, W.
DOUGLAS, J. W.	LANCE, W. D.	STARK, J.
EYNON, C. J.	LONGDIN, T. W.	TUDOR, W.
GLOVER, F. J.	MASTERS, H.	TURNBULL, H. J.
GOOLD, B.	MORRELL, C.	TURNER, W. H.
GRIFFITHS, H. T.	NORTHWOOD, H. G.	WEST, G. W.
HATHAWAY, F. H. W.	NORTON, T. E.	WHITWORTH, J. W.
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The Thursday Evening Classes extend over a term of SIX WEEKS, and are intended for those students who have previously failed in the examination, or who wish to present themselves at the next examination. The course consists of six hours practical chemistry and six lectures (of one hour's duration) on the most important points in each subject. Fee for the course, **10s. 6d.**; or **2s.** each night.

The Tuesday Classes are intended for students who have studied the subjects previously. The course extends over a term of three months. It includes fourteen hours practical chemistry and fourteen lectures on all the subjects required in the Minor examination. Fee—Three months, **£1 1s.**

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KENT.—Good class Retail, DISPENSING, &c. Returns £800. Good position. Private entrance. Price £700.

BIRMINGHAM.—Light Retail, PRESCRIBING, &c. Excellent opening for good practical Dentist. Returns £500. Rent £38. Price about £300.

SURREY.—Country RETAIL. Full prices. Fair Dispensing. Returns £500. Price about £400.

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DURHAM. — General RETAIL. Good Prescribing and excellent Proprietaries. Returns £900. Valuation about £500.

WORCESTERSHIRE. — Prescribing and light RETAIL. Returns £560. Valuation about £250.

Vendors of good class Concerns can be at once supplied with Partners or Buyers, as F. J. Brett has buyers prepared to invest from £1500 to £3000.

Transfers, Valuations and Auctions conducted throughout the United Kingdom by Mr. BRETT, Leicester.

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8, Stockbridge Terrace, Victoria Station, S.W.

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2. CHESHIRE ...	,,	1300.	,,	55.	,,	700.
3. STAFFORDSHIRE	,,	1200.	,,	60.	,,	1150.
4. KENT ...	,,	1000.	,,	60.	,,	600.
5. LIVERPOOL	,,	850.	,,	50.	,,	600.
6. KENT ...	,,	660.	,,	52.	,,	600.
7. ESSEX ...	,,	600.	,,	22.	,,	400.
8. LINCOLNSHIRE	,,	500.	,,	45.	,,	250.
9. ISLE OF MAN	,,	500.	,,	50.	,,	350.
10. ESSEX ...	,,	450.	,,	50.	,,	375.
11. LONDON, N.	,,	400.	,,	45.	,,	187.
12. NOTTINGHAM	,,	400.	,,	25.	,,	130.
13. ROTHERHITHE	,,	385.	,,	48.	,,	250.
14. HANLEY ...	,,	360.	,,	30.	,,	250.

Some of above, newly established, increasing rapidly.

SALE BY AUCTION.

GREAT Driffield.—Mr. F. PURDON will sell by auction (without reserve), by order of Mr. J. Asher, on Tuesday, October 9th, upon the premises in the Market Place, the whole of the Aerated Water Plant, Warehouse and Shop Fixtures and Trade Utensils. And on Wednesday, October 10th, in the Assembly Rooms, the whole of the Stock-in-Trade and other useful effects, which have been used for the carrying on of a large Retail Chemist's and Druggist's BUSINESS. Further particulars from the Auctioneer, Exchange Street, Great Driffield.

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The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

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Personal applicants receive Messrs. O. & Co.'s direct attention and advice, where required, free.

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"I find they greatly assist the sale of the Embrocation."

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OBSERVE. The Sale of these Preparations is increasing rapidly in all parts of the world, to a very great extent through persons recommending them to others. No tricky advertisements issued, nor are Press Notices accepted, offered to secure an order for advertising.

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London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 955.] SATURDAY, OCTOBER 13, 1888. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

LIBRARY.—SPECIAL NOTICE.

The following books are missing from the Library in London:—

Annalen der Chemie, Bd. 117-20, 213-16.
Art of Dispensing, 1885, 2 copies.
Attfield, Chemistry, 9th ed., 1881; 11th ed., 1885.
Attfield, Water and Water Supplies, 1884.
Beasley, Druggists' Receipt Book, 7th ed.; 8th ed.
Bell, Analysis of Food, vol. 2, 1883.
Bentley, Structural Botany, 1883.
Bentley, Materia Medica, 1887.
British Pharmacopœia, 1885.
Davies, Microscopic Mounting, 1881.
Fownes, Chemistry, Actonian Prize Essay, 1844.
French Codex, 1866.
Goodeve, Principles of Mechanics, 2nd ed., 1876.
Hardwich, Manual of Photographic Chemistry, 9th ed.
Ince, Latin Grammar, 3rd ed., 1885.
Martindale and Westcott, Extra Pharmacopœia, 2nd ed., 1884; 3rd ed., 1884.
Muter, Organic Materia Medica, 2nd ed., 1878.
Pereira, Selecta è Præscriptis, 17th ed., 1881.
Pharmaceutical Register, 1881, 1886.
Ramsay, Chemical Theory, 1884.
Remsen, Theoretical Chemistry, 2nd ed., 1884.
Reynolds, Experimental Chemistry, part 2.
Roscoe, Elementary Chemistry, 1873.
Stewart & Gee, Practical Physics, vol. 1.
Thorowgood, Materia Medica, 1st ed., 1874.
Wanklyn, Tea, Coffee and Cocoa, 1874.
Wills, Practical Botany.
— Vegetable Materia Medica, 6th ed., 1883.
Woodward, Arithmetical Chemistry, parts 1–2.

Members, Associates, and Apprentices are invited to examine their Libraries, and if any of the above-mentioned works be found therein, to forward such work or works to the Librarian of the Society.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society, of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of THREE ANNUITANTS on the Benevolent Fund of this Society will take place on Thursday, the 6th day of December next, at 12 o'clock precisely.

RICHARD BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 3rd, 1888.

There are at present *forty-nine* annuitants, receiving £1670 per annum, and casual relief is also granted, amounting in 1887 to nearly £500. The total expenditure in 1887 was £2375.

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OF THE

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Application for Admission to the School, for Prospectuses, or for further information, may be made, personally or by post, to either of the above Teachers or to their Assistants, in the Lecture Theatre or Laboratories, 17, Bloomsbury Square, London, W.C.

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Guaranteed Circulation of 7000 Copies Weekly.

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2.—That letters addressed to initials or to fictitious names at a Post Office are not delivered by the Post Office Authorities, but are at once sent back by them to the writers.

3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM. JOURN.**" and must be sent only to J. & A. CHURCHILL, 11, New Burlington Street, London, W.

Telegraphic Address, "Churchill, Publishers, London."

N.B.—The Journal is supplied from the publishing office post free to any part of the United Kingdom on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad (excepting India and China), 22*s.*; India and China, *viâ* Brindisi, 24*s.* per annum.

Payment may be made either by **Cash** in a Registered Letter, by **Postal Order**, by **Cheque** crossed London and County Bank, or by **Money Order**, payable at Regent Street, W., to J. & A. CHURCHILL. *Postage Stamps for any amount above Ninepence cannot be received in payment.*

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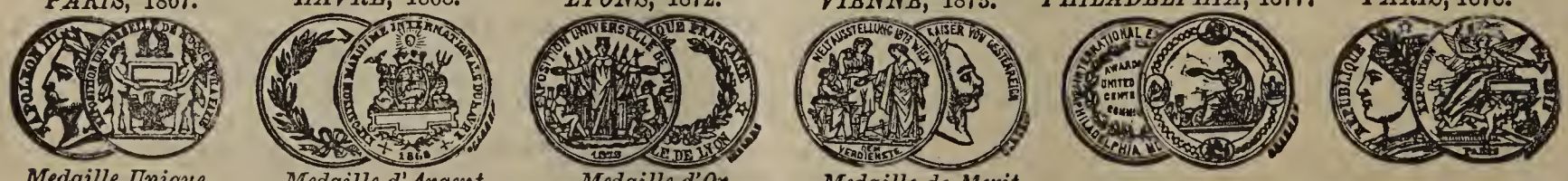

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OPINIONS OF THE TRADE JOURNALS.

From THE CHEMIST AND DRUGGIST, July 28th, 1888.

From Messrs. CRESSWELL BROTHERS, of 1 and 2, Red Lion Square, the famous Sponge dealers, we have a full and well illustrated price list of all sorts of sponges. Besides prices, this circular gives a great deal of information respecting sponges, with details of the natural and commercial history of the article. Several of the engravings in this list are produced by a new process, and the list itself is, we believe, the most complete, and contains more information than any which has been previously issued by any sponge house. Sponges are said to be now cheaper on the market than ever before, and Messrs. CRESSWELL BROTHERS assure us that they give the trade the full benefit of the lower prices.

From THE BRITISH AND COLONIAL DRUGGIST, July 28th, 1888.

CRESSWELL BROTHERS' SPONGE PRICE LIST.—This is a well got-up and attractive pamphlet, printed from a striking arrangement of type. It contains quotations for additions in assortments and kinds, particulars of reductions in prices, various new and beautifully executed illustrations, a concise natural history of the sponge, and press opinions. The list is worthy in every way of the reputation of the firm.

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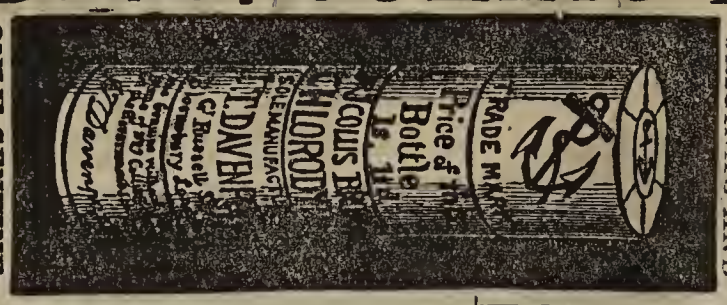
DR. J. COLLIS BROWNE'S CHLORODYNE



IS THE GREAT SPECIFIC FOR CHOLERA, DIARRHŒA, DYSENTERY.

COUGHS, COLDS, ASTHMA, BRONCHITIS.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Dr. J. C. BROWNE (late Army Medical Staff) DISCOVERED a REMEDY to denote which he coined the word CHLORODYNE. Dr. Browne is the SOLE INVENTOR, and, as the composition of Chlorodyne cannot possibly be discovered by Analysis (organic substances defying elimination), and since the formula has never been published, it is evident that any statement to the effect that a compound is identical with Dr. Browne's Chlorodyne *must be false.*

This Caution is necessary, as many persons deceive purchasers by false representations.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Vice Chancellor Sir W. PAGE WOOD stated publicly in Court that Dr. J. COLLIS BROWNE was UNDOUBTEDLY the INVENTOR of CHLORODYNE, that the whole story of the defendant Freeman was deliberately untrue, and he regretted to say it had been sworn to.—See *The Times*, July 13th, 1864.

GENERAL BOARD of HEALTH, London, REPORT that it ACTS as a CHARM, one dose generally sufficient.

Dr. GIBBON, Army Medical Staff, Calcutta, states: "2 DOSES COMPLETELY CURED ME of DIARRHŒA."

From SYMES & Co., Pharmaceutical Chemists, Simla. *Jan.* 5, 1880.

To J. T. DAVENPORT, London.

DEAR SIR,—We congratulate you upon the widespread reputation this justly-esteemed medicine has earned for itself all over the East. As a remedy of general utility, we much question whether a better is imported, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances *ad infinitum* of the extraordinary efficacy of DR. COLLIS BROWNE'S CHLORODYNE in Diarrhœa and Dysentery, Spasms, Cramps, Neuralgia, the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than Collis Browne's, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than Collis Browne's is a deliberate breach of faith on the part of the chemist to prescriber and patient alike.—We are, Sir, faithfully yours, SYMES & CO., *Members of the Pharm. Society of Great Britain, His Excellency the Viceroy's Chemists.*

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IMPORTANT CAUTION.—The IMMENSE SALE of this REMEDY has given rise to many UNSCRUPULOUS IMITATIONS. Be careful to observe Trade Mark. Of all Chemists. 1s. 1½d., 2s. 9d., and 4s. 6d.

SOLE MANUFACTURER,
J. T. DAVENPORT, 33 Gt. Russell St., W.C.

IMPORTANT DECISIONS.

Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

FURTHER IMPORTANT NOTICE.

The subjoined list of eminent Firms concur with Vice-Chancellor Sir W. Page Wood's statement in Court that Dr. Collis Browne was undoubtedly the Inventor of Chlorodyne; and that when Chlorodyne, or the Original Chlorodyne, is ordered, they invariably supply Dr. J. Collis Browne's :—

Apothecaries' Hall	London.	Frazer & Green	Glasgow.	Morson, T., & Son	London.
Allen, Hanbury & Co.	,,	Gale & Co.	London.	Newbery & Sons	,,
Baiss Brothers	,,	Giles & Son	Clifton.	Oldham, G., & Co.	Dublin.
Banks & Richards	Birmingham.	Goulding, Messrs.	Cork.	Parsons & Richardson	Leicester.
Barron, Harveys & Co.	London.	Grattan & Co.	Belfast.	Peake, Allen & Co.	Dublin.
Bell, John, & Co.	,,	Grimwade, Ridley	London.	Raimes & Co.	Edinburgh.
Corbyn & Co.	,,	Grindley & Son	Chester.	Sang & Barker	,,
Cox & Gould	,,	Hearon, M'Culloch & Co.	London.	Sanger, J., & Sons	London.
Curling & Co.	,,	Hodgkinson, Tonge & Stead	,,	Sim, James, & Co.	Aberdeen.
Davy, M'Murdo & Co.	,,	Hopkins & Williams	,,	Smeeton, W.	Leeds.
Dobbin, W., & Co., Limited	Belfast.	Hovenden, R., & Sons	,,	Southall & Co.	Birmingham.
Drew, Barron & Co.	London.	Johnson, J. H. & S.	Liverpool.	Sutton, W., & Co.	London.
Drew, B., & Alexander	,,	Langton, W., & Co.	London.	Tomlinson, Hayward & Co.	Lincoln.
Dunn & Company	,,	Lynch & Co.	,,	Treacher, Hodgkinson & Co.	London.
Edwards, W.	,,	Mackay, John, & Co.	Edinburgh.	Westwood & Hopkins	,,
Evans, Lescher & Webb	,,	Mander, Weaver	Wolverhampton.	Woolley, James	Manchester.
Evans, Gadd & Co.	Exeter.	Marsden & Sons	London.	Wyleys & Brown	Coventry.
Ferris & Co.	Bristol.	Maw & Son	,,	Yates & Co.	London
Foulger, S., & Son	London.	Meggeson & Co.	,,		

After these public statements in a Court of Equity, and subsequent confirmation by the trade at large, no Chemist can conscientiously use or sell any other compound for Chlorodyne, without committing a breach of faith, unjust to patient and physician. The *value* of the remedy *alone* creates the great demand.

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Hot Water, Infusions, &c.

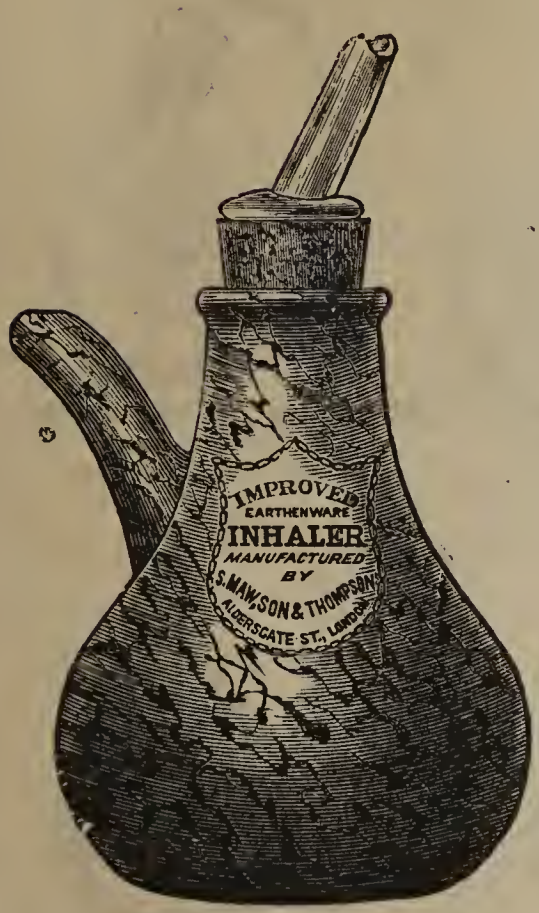

Fig. 8.
MAW'S IMPROVED.

Fig. 6.
MAW'S DOUBLE-VALVED.

Fig. 8a.
MAW'S IMPROVED.

Fig. 6.—Double-Valved, 60s. per dozen; with Elastic Tubes, 78s.
Fig. 8.—Marbled, 32s. per dozen. Fig 8a.—White, 21s. per dozen.
Fig 8a.—White, half size, 13s. per dozen.

ELASTIC TUBES, with Mouthpieces, to fit Fig. 8 and 8a, 7 inches long, 8s. per dozen; 9 inches long, 12s. per dozen.

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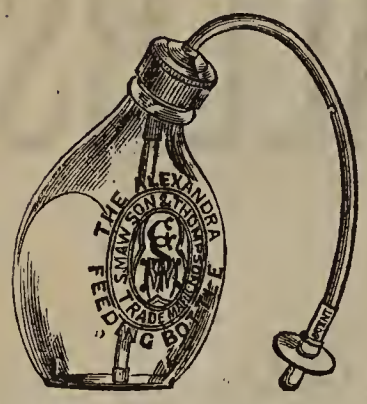

Alexandra Feeding Bottle,
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11*s.* per doz.

Alexandra Feeding Bottle,
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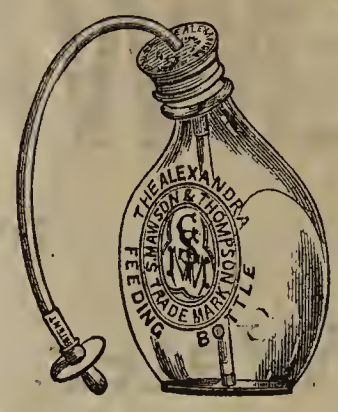

Alexandra Feeding Bottle,
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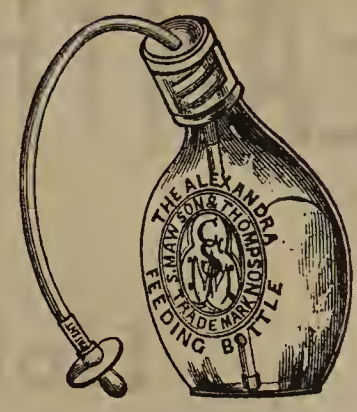

Alexandra Feeding Bottle,
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Alexandra Feeding Bottle,
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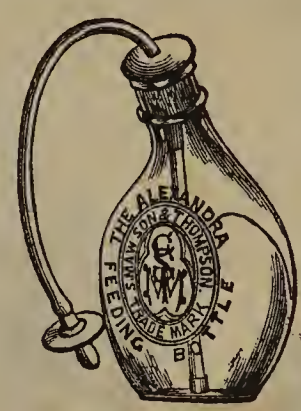

Alexandra Feeding Bottle,
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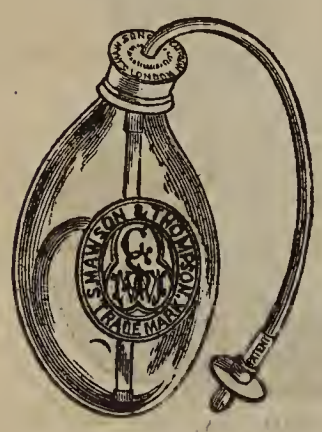
3*s.* and 3*s.* 8*d.* per doz.



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Export Feeding Bottle,
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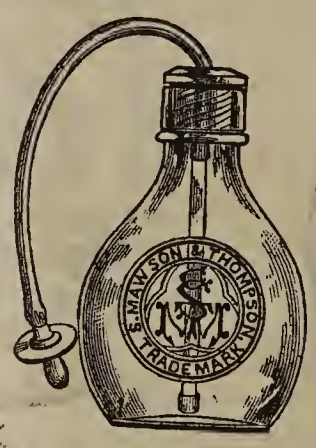
7*s.* 3*d.* per doz.



Export Feeding Bottle,
Screw Glass Stopper.
7*s.* 6*d.* per doz.

Export Feeding Bottle,
Screw Metal or Earthenware Cap.
9*s.* per doz.

Export Feeding Bottle,
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4*s.* 6*d.* per doz.

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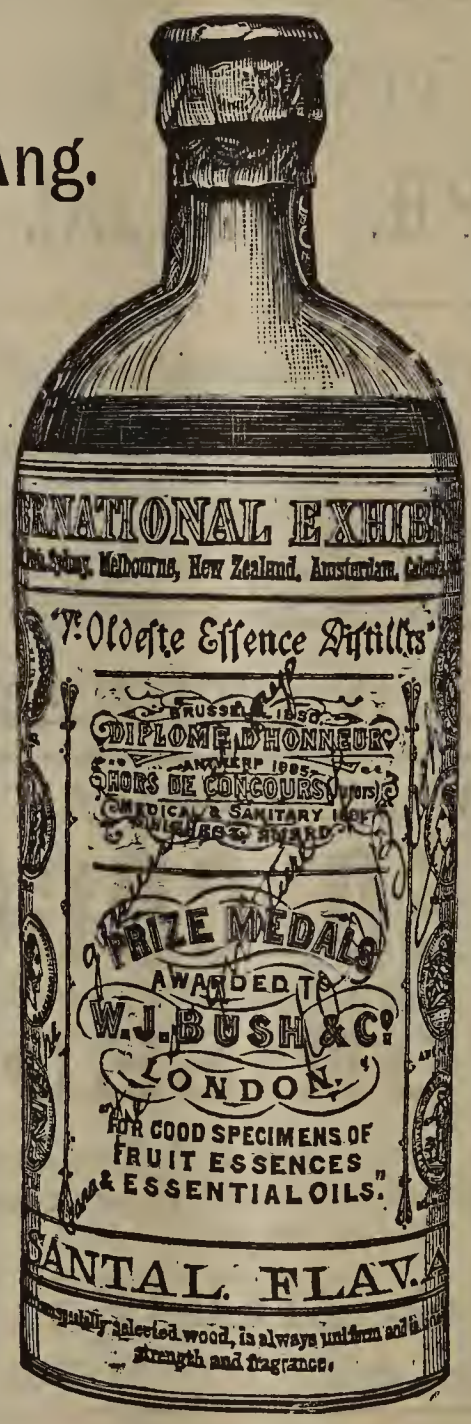

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TO THE DRUG TRADE.

What the Journals say about Colgate's Cashmere Bouquet Toilet Soap and Perfume.

CASHMERE BOUQUET SOAP.—We reprint the following extracts from notices of this delightful toilet soap in order that the Drug Trade who have not already stocked it may see that it will pay them to do so, and to introduce it to their customers.

SPECIAL OFFER.—CASHMERE BOUQUET PERFUME.—To enable Chemists to introduce this perfume in a practical manner, we will supply thirteen bottles for each dozen ordered, the extra bottle to be opened and placed upon the counter, where customers may have an opportunity of trying it. The remarkable delicacy and fragrance of this perfume make it an article of ready sale.

From "Piccadilly."

I seem to have no end of novelties to tell you of to-day, and the last one is some new soap which hails from America, and is a most excellent article and pleasant to use, for I have got some. It is called Cashmere Bouquet, and is the invention of Messrs. Colgate & Co. The manufactory is 55, John Street, New York, but you can easily get it here.

From the "Star."

The other day, passing through Paris, I found as usual I had come without any soap. At an English chemist's I was offered, and accepted, a soap that was quite new to me—Colgate's. It is an exquisite soap, creamy, smooth, and with a ready lather. It leaves a beautiful feeling on the skin. After using it I felt for a while as if my complexion were as fresh and as smooth as a baby's. I don't know whether it has yet got into the shops. It ought to be popular. It is certainly a beautiful soap. A lady tells me it is especially good in London, as it softens the hard water. A friend of hers who went frequently to America had always to bring a packet back. Since she discovered she can get it here, she has been able to spare him this trouble.

From the "Court Circular."

It is somewhat remarkable that out of the two or three hundred exhibits at South Kensington no less than eleven stands are devoted to perfumery, and it is also noteworthy that, although some of the best English perfumers are here represented, it is to an American firm that the palm must be accorded, viz., Messrs. Colgate & Co., of New York, whose particular specialities are their Cashmere Bouquet and Cashmere Bouquet Toilet Soap, both of which are so refreshingly sweet, and so unlike any other perfumery we have come across, that of themselves they are sufficient to make the fortune of any firm of perfumers. The firm are said to be the largest and oldest toilet soap makers and perfumers in America, having received no less than thirty awards, and if the other preparations at all approach their Cashmere Bouquet, they will deserve all the honours they have obtained. The exhibits themselves form a highly artistic arrangement. Our opinion is that Cashmere Bouquet is positively unequalled.

From the "London Medical Recorder."

Colgate & Co.'s Cashmere Bouquet Toilet Soap.—This is a high-class toilet soap of a pale straw colour, highly fragrant, manufactured by Messrs. Colgate, extensive manufacturing perfumers, of New York. The firm make no less than 103 different kinds of soap, but the Cashmere Bouquet has obtained so much favour that, we are informed, the quantity sold last year exceeded that of all other fancy soaps imported into the United States. Messrs. Colgate & Co. have been lately awarded a Gold Medal at the Ostend Sanitary Exhibition for their Cashmere Bouquet Soap and Perfume.

Colgate's Cashmere Bouquet Soap, price retail 1s. 3d., per doz. 10s., per gross 110s. net. Colgate's Cashmere Bouquet Perfume, price 1 oz., 2s. 6d. retail, 22s. per doz., 255s. per gross; 2 oz., 4s. retail, 30s. 9d. per doz., 355s. per gross, of all Wholesale Druggists.

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HARROGATE AS A HEALTH RESORT.

In the centre of Yorkshire, on the edge of a moorland plateau stretching many miles north and west, and at a mean altitude of 400 feet above the sea, is situated the celebrated watering place of Harrogate. It possesses an atmosphere remarkable for purity, dryness, and invigorating properties, an important adjunct to the medicinal virtues of the mineral waters.

As a health resort Harrogate has had a reputation for more than three hundred years. In 1571 the Tewit Spaw, a chalybeate water, was first discovered by Mr. William Slingsby, who, the old chronicle tells us, "had travelled in Germany in his younger years, seen and been acquainted with theirs, and as he was of an ancient family near the place, so he had fine parts, and was a capable judge."

Dr. Dean of York in his *Spanderine Anglica*, published in 1626, was the first who wrote upon the Harrogate mineral waters. Quoting his words, "No place in this nation can boast of such diversity of earths, quarries of stone, minerals and mines of metals. All of which demonstrate that nature has stored this little territory with a greater diversity of hidden benefits than great and spacious countries, and that the fountains hereabouts must partake of their nature and properties." Perhaps no place in Europe possesses so many varieties of qualities and strengths of sulphuretted and ferruginous waters as are to be found in this locality. In what is called the Bog Field, within the compass of about an acre of ground, there are thirty-five springs of various kinds; while a space measuring 760 yards by 180 yards contains, with the exception of two of the weak chalybeate springs, all the varieties of mineral waters, some seventy in number.

The total yield of solid constituents from these numerous springs has been estimated by the writer at something like 80 tons per annum, sufficient to form two obelisks the size of Cleopatra's needle.

The richness of this locality in mineral waters is due to its geologic formation. It is here the great *anticlinal** terminates, which extends from Clitheroe in Lancashire. Along its course oozings of weak saline water more or less impregnated with sulphur are to be observed; these have been traced at various points for many miles.

The sulphur waters of Harrogate rise through a dark, almost black shale. Above this are the shales, finely laminated; overlaying them is a calciferous encrinital grit belonging to the Yoredale Rocks; superimposed upon these are the milstone grit series, interspersed with beds of shale.

The pure chalybeate waters are generally found to issue from these latter strata; those more strongly charged with saline constituents originate nearer the anticline.

Although Harrogate possesses such an ancient reputation, only here and there are scattered remnants of old Harrogate, easily recognized by their cream-tinted walls and flagged roofs. The whole town is comparatively modern, and consists principally of well-built villa residences ornamented with well-kept gardens. The few streets are spacious and adorned with splendid buildings; the hotels, for the most part situated in their own grounds, are numerous, large and replete with every convenience and luxury; the shops for variety and style it would be difficult to surpass. Surrounding the greater portion of the town is the Stray of 200 acres of grassy common, an unenclosed portion of the Old Forest of Knaresborough, dating back to the time of the Conqueror. This fine open breezy bit of common land is of infinite value to the town. It is open to the public and the visitor can stroll at will over the green sward, or rest on the seats scattered over the broad expanse.

The town occupies a large extent of ground, being interspersed with open spaces. The salubrity of the place is proverbial. This is well illustrated by the low rate of mortality, the average for the last seven years being only 13·4 per thousand.

The domestic water supply is extremely pure, soft and abundant. It is collected from springs situated on the moors issuing from the grits, and far removed from all possible sources of contamination.

The drainage and sewerage systems are all that can be desired; the irrigation system adopted some years ago by the authorities is most successful.

The rainfall is less, and there are fewer rainy days than the average of English health resorts. Last year the rainfall was only 21·59 inches; this, however, was quite exceptional.

The town is well supplied with comfortable and commodious Hackney carriages and bath chairs, affording every facility for the visitors enjoying the numerous picturesque drives in the neighbourhood.

The level and extensive footpaths throughout the town and its vicinity are well adapted for the chairs. There are more than twenty-two miles of asphalted and flagged footpaths, and in addition seven miles of smooth gravel walks, drying rapidly after rain, and furnishing easy and comfortable routes for pedestrians. Few districts are so well supplied with footpaths radiating in every direction, where the visitor may enjoy delightful rambles through the fields, woods and shady lanes.

But the chief attractions to visitors are of course its mineral waters. The tables on the following pages show the classification and analyses of the chief varieties of the principal springs.

The Old Sulphur Well.

Edmund Dean, Doctor in Physic, Oxon., dwelling in York, first drew public attention to the virtues of this famous spring in his *Spanderine Anglica*, published in 1626, as follows: "The waters of this sulphurous fountain cast forth a stinking smell afar off, in the winter season and coldest weather especially. They are very cold and have no manifest heat, because their mines and veins of brimstone are not kindled under the earth, being hindered from the mixture of salt therewith." Dr. Dean further informs us, "Such as drink the water verily believe there is gunpowder in it, also that it is efficacious in expelling reef and fellon, morphew, tettars, ringworm, and the like." Its virtues were more fully set forth by Dr. Michael Stanhope in his 'Cures without Care; or, a Summons to all such as find Little or no Help by the Use of Physick, to Repair to the Northern Spa,' published in 1632. Since this date the water has engaged the attention from time to time of a long series of eminent physicians and chemists, who, for the most part, have left on record their experiments and analyses, which indicate that the general composition has undergone no material change for the last hundred years. Certain well-marked variations, however, have undoubtedly occurred at various periods. For instance, the observations made by several chemists prove con-

* The geologic term where strata dip away from an axis so as to form an arch or saddle.

clusively that at one time, and so recently as 1853, sulphates were present in the water. These have disappeared and have been replaced by barium chloride to the extent of 6½ grains per gallon. This constituent, together with traces of strontium and lithium, were first discovered by the writer in 1866.

None of the other sulphur waters possess such an ancient history as the "Old Well;" they have either been used formerly for bathing purposes only or else have been formed by sinking wells. This process of multiplication is no longer allowed by the authorities. Excavations are not permitted, under heavy penalties, within a radius of six hundred yards of the old sulphur well.

The stranger should not omit a visit to the old sulphur well or Montpelier pump rooms, where the mineral waters, heated to about 120° F., are supplied by the attendants to the numerous visitors who flock there in the early morning. This novel and interesting period to the spectator occurs before breakfast; the drinkers assemble in the greatest number about eight o'clock. The heating of the sulphur and saline chalybeate waters is effected by means of an apparatus called a therma. The mineral waters pass through pipes coiled in a pan of water kept heated to the requisite temperature, so that they are delivered without any deterioration, no loss of sulphur or gaseous constituents resulting in the one case nor precipitation of the iron in the other. This mode of heating was first employed in 1875.

As regards the properties of these medicinal springs, quoting from a compilation by the Harrogate Medical Association, "The action of the sulphur waters depends on quantity prescribed, time when taken and temperature; hence they are laxative, aperient, or purgative, diuretic, or alterative. They prove highly beneficial in most forms of indigestion with its usual accompaniments." "Their alterative action is difficult to explain in a popular notice, but it is clearly demonstrated by the good result following their use in all forms of chronic skin diseases, and in the changes produced by their judicious and prolonged exhibition in unhealthy constitutions." When the sulphur waters are used externally, either as lotions, local or general baths, their action in the first place is stimulant, they rouse the nerves of the skin, promoting circulation and free perspiration on the subsidence of their activity. They have a sedative action, evinced in the lessening of irritation, swelling, and pain. "Sulphur baths prove most successful in chronic skin diseases, gout, rheumatism, and jaundice, and effectually co-operate in all cases when the internal administration of the sulphur waters is advisable."

The town of Harrogate possesses a municipality of recent creation. The corporation are the custodians of the spas and have recently acquired by purchase, for the sum of £29,500, the Montpelier Gardens in the centre of the town, comprising its numerous drinking and bathing waters, including the valuable Kissingen or saline chalybeate spa, together with its pump room, bathing establishment, and ornamental grounds. The Victoria baths, which have been constructed at a cost of £30,000, afford every accommodation to the bather; the bath rooms are numerous and commodious. In addition to the ordinary immersion baths, special bathing accommodation is provided for administering sulphur spray,

Table of the Analyses of the Sulphur Group.

Saline constituents in grains per gallon.	Old Sulphur Well. Royal Pump Room. (Thorpe).	Strong Sulphur. Montpelier. (Attfield.)	New or Mild Sulphur. Royal Pump Room. (W. A. Miller.)	Mild Sulphur. Montpelier. (Attfield.)	Magnesia. (Muspratt.)	Starbeck Spa. (Fairley.)
Sodium sulphydrate	5·215	—	6·89	—	—	—
Sodium sulphide	—	14·50	—	8·777	·707	1·36
Barium chloride	6·566	—	trace	—	1·222	trace
Strontium chloride	trace	2·816	—	·619	trace	—
Calcium chloride	43·635	79·936	16·70	31·296	—	—
Magnesium chloride	48·281	57·989	2·39	27·589	1·792	—
Potassium chloride	9·592	4·811	11·34	5·691	27·913	—
Lithium chloride	·753	trace	trace	—	trace	trace
Ammonium chloride	1·031	·996	—	·656	trace	trace
Sodium chloride	893·670	827·371	582·95	388·800	215·896	116·44
Magnesium bromide	2·283	—	—	—	trace	trace
Magnesium iodide	·113	—	—	—	trace	trace
Calcium carbonate	29·768	8·750	—	—	18·476	10·01
Magnesium carbonate	5·953	—	—	—	12·799	3·51
Potassium carbonate	—	—	—	—	—	·65
Sodium carbonate	—	—	—	—	—	14·47
Barium sulphate	—	·418	—	—	—	—
Strontium sulphate	—	·529	—	—	—	—
Calcium sulphate	—	—	—	—	—	1·88
Silica	·701	3·570	2·40	3·836	1·608	3·27
	1047·561	1003·000	654·87	485·258	280·413	151·59
Gases in Cubic Inches.						
Sulphuretted hydrogen	10·16	—	4·18	—	—	—
Carbon dioxide	40·10	60·00	13·22	54·00	11·50	—
Carburetted hydrogen	—	2·30	—	·80	—	—
Nitrogen	—	3·70	2·01	3·20	6·14	—
	50·26	66·00	19·41	58·00	17·64	—

Table of Analyses of the Saline Chalybeate and Iron Group.

Saline constituents in grains per gallon.	Kissengen Spa. (Attfield.)	Chloride of Iron Spa. (Thorpe.)	Alexandra Chaly-beate. (Davis.)	Carbonate of Iron Spa. (Muspratt)	Pure Chaly-beate, Royal Pump. (Davis.)	Tewit Well (Hof-mann.)	John Well or Old Spa.	Alum Well (Davis.)
Ferrous chloride	—	13·213	—	—	—	—	—	—
Ferrous carbonate	9·590	11·050	5·800	6·042	1·364	1·358	1·271	—
Ferrous sulphate	—	—	—	—	—	—	—	69·33
Ferric sulphate	—	—	—	—	—	—	—	78·76
Aluminium sulphate	—	—	—	—	—	—	—	89·47
Calcium sulphate	—	—	9·097	7·625	·749	·697	·307	56·91
Magnesium sulphate	—	—	—	—	—	—	—	57·38
Potassium sulphate	—	—	—	—	—	—	—	3·14
Ammonium sulphate	—	—	—	—	—	—	—	2·19
Barium sulphate	·509	·222	—	—	—	—	—	—
Potassium chloride	21·425	3·205	1·130	·150	—	1·323	—	—
Sodium chloride	674·598	277·561	176·370	11·650	1·625	·280	1·543	33·96
Ammonium chloride	·439	·406	trace	—	trace	trace	trace	—
Barium chloride	—	5·204	—	—	—	—	—	—
Strontium chloride	·887	·624	—	—	—	—	—	—
Calcium chloride	87·337	94·015	—	2·311	—	—	—	—
Manganese chloride	—	·971	trace	—	trace	trace	—	—
Magnesium chloride	65·391	57·315	4·735	13·148	—	—	—	—
Lithium, iodides, bromides, fluorides	traces	traces	traces	—	traces	traces	—	—
Barium carbonate	2·136	—	—	—	—	—	—	—
Calcium carbonate	8·858	—	13·762	·341	1·532	1·435	2·264	—
Magnesium carbonate	—	—	5·785	—	1·952	2·667	3·039	—
Potassium carbonate	—	—	—	—	·262	1·057	·991	—
Sodium carbonate	—	—	—	—	1·103	—	1·338	—
Silica	3·570	1·414	·675	·204	·502	1·041	trace	3·27
Organic matter	—	—	1·450	—	·750	·663	trace	—
	874·740	479·754	218·804	41·471	9·839	10·500	10·753	394·41
Gases in Cubic Inches.								
Carbon dioxide	21·3	53·55	17·04	—	13·74	11·85	14·95	—
Carburetted hydrogen	—	—	—	—	—	—	·15	—
Oxygen	1·5	—	·31	—	·82	·40	·67	—
Nitrogen	5·2	—	8·98	—	8·00	5·53	6·35	—
	28·0	—	26·33	—	22·56	17·78	22·12	—

sulphur vapour, sulphur douche, and medicated baths, etc., on the most approved principles.

Recently the Corporation have built a series of twelve covered reservoirs, holding in the aggregate 360,000 gallons, and constructed in the manner best adapted for the conservation of the sulphur water, which for want of storage room formerly ran to waste during the winter months. Covers, consisting of gutta-percha tissue stretched upon frames, float on the surface of the stored water; these are found to retard to a very great degree the deterioration of the water. To such an extent is this proved to be, that after an interval of several months the loss of sulphur is confined to a comparatively small percentage. The present storage accommodation is more than sufficient, allowing for all possible requirements for some years to come.

The picturesque little valley leading from the old sulphur well pump room to the Bogs Field has also been lately acquired by the corporation and laid out as a pleasure ground, affording a sheltered and convenient promenade to visitors while drinking the waters.

The Concert Room, with its seven acres of ornamental grounds, well wooded and interspersed with serpentine walks, is the property of a company who provide an excellent band throughout the season, as well as other entertainments, vocal and instrumental. This, with its covered glass colonnade and well proportioned concert room, is a great attraction to visitors.

The Town Hall Theatre, under excellent management, is another most attractive source of amusement; some of the leading companies from London are engaged during the season. There are also clubs for cricket, lacrosse, lawn tennis and cycling, and reading rooms attached to the free library, church institute, etc.

Within a few minutes or hours' journey, places and localities of great interest may be visited. York, with its magnificent cathredral, its old fortified walls and bars, Roman antiquities, etc.; Ripon and its small minster of great antiquity, while near are the celebrated ruins of Fountain's Abbey, perhaps more extensive and perfect in detail than any monastic ruins in the kingdom; Bolton Priory, and its beautiful and romantic woods, in which is the far-famed Strid, a chasm where the river Wharfe is so narrowed that it may easily be leaped over; Brimham Rocks, a high moorland, the summit scattered over in great profusion with huge rocks of most grotesque shapes, rocking stones, etc.; Malham Cove

and Gordale Scar, the latter a gorge where the precipitous and overhanging walls of rock tower up more than 300 feet in height. The battle fields of Towton and Marston Moor; Knaresborough and its old castle overlooking the river, dropping well, etc., and many other places might be named of great interest to the geologist, antiquarian and botanist.

A NEW CONSTITUENT OF LIVER OIL.*

BY H. MARPMANN.

The author states that by washing liver oil with 95 per cent. alcohol he has obtained a peculiar substance, which is easily soluble in water, and insoluble in alcohol, ether and benzene. According to the age and colour liver oil dissolves more or less readily in alcohol; but even when sixty parts of alcohol are used to one pint of oil a perfect solution is not obtained, there being always a residue of insoluble fat acids, which are dissolved by hot alcohol and by ether, but not by cold alcohol. As the substance in question is somewhat soluble in hot alcohol, the last traces of the insoluble compounds were washed out by means of cold alcohol, and the material worked upon was not the solution of oil in alcohol but the portion washed out of it on account of its insolubility.

This insoluble residue after repeated shaking with alcohol, was mixed with water and filtered. The portion soluble in water was, however, so small that the author is only able at present to give the general reactions of the aqueous solution. It had a faintly acid reaction, rotated polarized light to the left, gave with lead acetate and with tannic acid a slight turbidity, and was not altered by potassium ferrocyanide. A dilute solution gave with ferric chloride no reaction, but a concentrated solution assumed with it a dark yellow colour, which upon boiling became blood red, and again yellow upon cooling. The solution upon boiling was not changed by strong nitric acid, ammonia, or potassium hydrate. On the other hand it reduced alkaline copper solution. Upon mixing the solution with orcin and hydrochloric acid in a porcelain dish, and evaporating on a water-bath to dryness there remained a brown residue, having a metallic lustre. This dissolved in alcohol with a dark brown colour, and the solution was coloured gray-brown by ammonia. By this last reaction this constituent of liver oil soluble in water is distinguished from varieties of gum, since gum gives with orcin a green residue, that dissolves in alcohol with a greenish yellow colour, and this solution when treated with ammonia is coloured yellow, with a tinge of greenish violet.

According to the rotatory power of the new substance and its behaviour towards Fehling's solution it might have been supposed to be gum, or an albumenoid or a sugar. For its qualitative distinction from any of these compounds the author found the orcin test most suitable, and he therefore describes the reaction somewhat in detail.

Orcin is the chromogen of various colouring matters, and is obtained from species of *Roecella* and *Variolaria* by boiling with milk of lime, and extraction of the neutralized and evaporated filtrate with alcohol, from which it crystallizes out in colourless crystals. The orcin is freely soluble in water, and is readily altered on the addition of hydrochloric acid. Upon evaporating such a solution on a water-bath the residue is of a beautiful red colour; this residue dissolves in alcohol with a rose colour, which is changed to a very beautiful violet upon the addition of a few drops of ammonia solution. Small quantities of organic substances modify these colour reactions very considerably, so that orcin constitutes an important reagent for such bodies, especially for carbohydrates.

Constant colorations are also obtained upon boiling a dilute solution of a carbohydrate with an equal volume of hydrochloric acid and about one per cent. of orcin, and afterwards adding alcohol and ammonia. But these reactions do not take place so smoothly as those obtained when evaporation is practised.

The author prepared a solution of one gram of orcin in 100 c.c. of pure hydrochloric acid, of which he placed about 0·5 c.c. upon a porcelain dish, then added about an equal quantity of the substance to be tested, and evaporated upon a water-bath. As soon as this small quantity of liquid became warm the colour reaction began, the evaporated layer becoming coloured at the margin. When it was dry alcohol was added, which dissolved the residue more or less completely. This alcoholic solution had a constant colour for each substance, which upon the addition of a few drops of ammonia solution was altered more or less. Strong oxidizing agents, such as nitric acid, give very strong colorations with orcin, on which account such additions are to be avoided.

In the following table the colour reactions of orcin with various substances tested are described :—

	Evaporation residue.	Solution in alcohol.	Addition of Ammonia.
Gum Arabic . .	Green	Green-yellow	Green-yellow-violet.
Gum Tragacanth	Green-black	Grcen-yellow	Brown.
Gum Senegal .	Greenish blue	Green-yellow	Green-yellow.
Potato Starch .	Red	Light brown	Violet-yellow.
Maranta starch	Red	Brown	Brown.
Triticum Starch	Yellow-red	Light brown	Brown.
Milk Sugar . .	Brown-red	Yellow-brown	Greenish-brown.
Beet Sugar . .	Brown	Yellow-brown	Brown.
Cane Sugar . .	Brown	Yellow-brown	Brown.
Gelatin	Red	Yellow-red	Violet.
Pepsin	Yellow	Yellow	Dark-yellow.
Pancreatin . .	Brown	Light-brown	Rose-violet.
Albumen, fresh .	Yellow-brown	Light-brown	Brown.
Albumen, boiled, dissolved in Pepsin . . .	Yellow	Light-brown	Brown.
Albumen, boiled, dissolved in Pancreatin . .	Brown	Light-brown	Brown-violet.
Residue from alcoholic solution of Liver Oil .	Brown	Light-brown	Brown-green.
Pure Orcin . .	Red	Rose	Violet.

According to this comparison the residue from liver oil showed most resemblance to pancreatin and albumen that had been dissolved by pancreatin. This suggested the idea of seeking the new substance in fresh pancreatic liquor.

Fresh aqueous pressings from pancreas glands were precipitated with alcohol, the precipitate washed with alcohol, then dissolved in water, and again precipitated, washed and redissolved in water. The resulting solution rotated a polarized ray to the left and reduced alkaline copper solution. By evaporating over sulphuric acid a non-crystalline residue was obtained. It was therefore considered probable that the two substances from liver oil and pancreatic juice were identical, and this assumption was made tolerably certain by a comparison of the influence of the two substances upon fixed oils. A few cubic centimetres of the solutions mixed with any of the fatty oils acted so that the oil could be temporarily emulsified with half its volume of water, and after several hours the oil did not separate pure, but with a somewhat milky turbidity.

The author states that he has found this new substance in all the samples of liver oil examined, both in the white oils and in the darkest varieties, from the most diverse commercial sources. He thinks it might be present in fresh livers in larger quantity, since liver oils deposit a quantity of mucus upon standing. But at present he has not examined any perfectly fresh oils and cannot therefore speak with certainty upon this point.

* From the *Pharmaceutische Centralhalle*, August 23.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 13, 1888.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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PROVINCIAL EDUCATION IN PHARMACY.

THE season usually devoted to educational matters has now fairly set in, and we find provincial schools of pharmacy waking up from their summer sleep and following the lead of the mother school in the metropolis. Their number and position do not seem to vary greatly from those of last year, what changes there are being minor ones, and as yet they appear to hold their ground fairly well. It may be worth pausing for a little time to consider the prospects of these attempts to make systematic pharmaceutical education more generally accessible. In the first place, it seems plain that the most important factors in the progress of provincial schools under existing conditions are three: a constantly-renewed supply of raw material in the shape of students; the sympathetic and practical support of established pharmacists in the district; and, the recognition of all efforts by the whole body of pharmacists in the country. The want of the first factor has proved fatal to many plans in different towns, for whilst the class registers have been well filled at the commencement, there has been a gradual decrease in the number of students each succeeding year. The second necessity makes it incumbent upon all lovers of educational advancement to contribute largely and freely to the funds of the local schools, whilst the third is illustrated by the action of the Council of the Pharmaceutical Society, as representing British pharmacy, in granting pecuniary aid to such associations as have proved their ability in some degree to help themselves in attaining the desired object.

The school founded by the Sheffield Society three years ago, and now entering upon its fourth session, appears to be pre-eminently the most successful of its kind. It is interesting to notice that it is strong in so far as the conditions above specified actually obtain, and it is only likely to court ultimate failure by the neglect of one of them. The number of students has increased year by year, and there appears at present little prospect of falling off in this respect, whilst the quality is no whit behind the quantity. Again, the grants accorded from the Pharmaceutical Society's treasury to further the ends promoted by the Sheffield pharmacists, leave no room for doubting that the school will fail for want of external aid. But it is very evident that the local aid is not what it might be. The tuition has been voluntary from the commencement, for there has as yet been no lack of enthusiasm. But will this state of affairs continue? Is it fair that the majority should contribute but the smallest of subscriptions whilst those who lecture are expected to give so much skill and energy in addition? This reproach, for such it surely is, should be taken away. The lovers of educational advancement should endeavour to provide the means for supporting qualified teachers when voluntary lecturers fail. Otherwise it is unreasonable to anticipate complete success.

It must not, however, be forgotten that in urging such increased liberal support of provincial schools locally it is done chiefly on account of the circumstances under which pharmaceutical education has now to be provided for. We cannot even affect to believe that the necessity of examination has produced such a healthy demand for education that it is felt to be indispensable, and that it is consequently sought for as any other necessary of existence would be. Pharmaceutical education is only provided for as it were by stealth, and the success of any school where real training and teaching are the objects contemplated may be regarded as almost the result of a system of bribery by which students are induced to attend the classes. If, however, sound pharmaceutical education be really desirable for the younger members of the body, it must also have its value for those who undertake the onerous task of teaching. No system which does not provide for the due remuneration of the teachers can be relied upon as likely to last, and however much individual enthusiasm is entitled to commendation for supplying the wants of schools under existing conditions it is evident that a sounder and more business like mode of dealing with this matter must be devised. It must be remembered in connection with this point that if the Bill now before Parliament were passed one of the most immediate results would be an increase in the number of provincial schools. It is even probable that increase would be very considerable, and, consequently, if all such schools were to rely upon the Pharmaceutical Society for pecuniary support or assistance to enable them to pay competent teachers the demand upon the Society's funds would become severe. But there is no reason why the cost of educating pharmaceutical students should to any extent take the form of a tax upon those who are actually in business. It would, moreover, be inconsistent with the advancement of pharmacy, which is admitted by all to be desirable, that the educational training requisite for attaining that object should be offered or accepted upon a charitable basis. In so far as teaching is felt to be a neces-

sity, it will have a value for the recipients as well as for those who undertake to provide it for their benefit, and it is to be hoped that with the establishment of additional provincial schools this view of the matter will lead to the recognition of the principle that they should be as far as possible self-supporting. It is by the attainment of that condition that they can best demonstrate their success and real utility.

At the first sitting of the British Pharmaceutical Conference at Bath last month, a resolution was passed authorizing the sending of a cablegram expressive of fraternal greeting to the American Pharmaceutical Association, then in session at Detroit, and the fact that up to the close of the Conference no response had been received from that body did not escape comment, which proves to have been not only premature, but incorrect. It appears from a letter received by Mr. F. B. Benger, in which Professor Maisch, on behalf of the American Association, acknowledges and reciprocates the courtesy, that delay was caused by a mistaken apprehension that when the cablegram was received at Detroit, on the 4th ult., the meeting at Bath had already terminated, and that therefore no useful purpose would be served by replying through the cable. Professor Maisch mentions that next year the American Pharmaceutical Association will meet in San Francisco, and he certifies to the welcome that would be given to any members of the Conference who might be able to attend this meeting on the shores of the Pacific.

* * *

A correspondent expresses surprise at finding that the excise officer in his town requires him to obtain a sweet wine license in order to sell coca wine. He also thinks "it is strange that there has been no comment on this subject in the *Pharmaceutical Journal*." The really strange fact, however, is that our correspondent, being interested in the sale of coca wine, should not have noticed the reference made to it both in the report of the Formulary Committee, p. 212, and in our article upon the report of the Commissioners of Inland Revenue in the same number of the Journal. Coca wine is regarded by the excise authorities as being so prepared, that both as to flavour and the size and frequency of the dose recommended, it is like other preparations of the kind, intended for use as a beverage. Consequently, they require sellers of coca wine to take out a license.

* * *

It will be seen from the report of the meeting of the Council of the Pharmaceutical Society of Ireland that the subject of accidental poisoning by carbolic acid has again been under consideration by that body, and that in pursuance of the view taken with regard to it on a previous occasion it has been resolved to urge again upon the Privy Council the desirability of adding carbolic acid to the poison schedule. The proposal to do so met with the approval of the King and Queen's College of Physicians in Dublin in 1882.

* * *

The next meeting of the Chemists' Assistants' Association will take place on Thursday next, the 18th inst., when a paper will be read by Mr. T. A. Ellwood on "Gum Arabic and its Substitutes."

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

October 9, 1888.

The following are the questions that were set for the Preliminary examination on that date:—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. (*For all Candidates.*) *Translate into Latin:—*

1. Good citizens willingly obey the laws of their country.
2. A large reward was given by the senate to my brother.
3. It is a Roman's duty to die for his country.
4. Ought we not to believe that God takes care of men?
5. The letter having been well written, the boy will receive praise.

II. Translate into English either A. (Cæsar) or B. (Virgil).

(*Candidates must not attempt both authors.*)

A. CÆSAR.

1. Erant omnino itinera duo, quibus itineribus domo exire possent; unum per Sequanos, angustum et difficile, inter montem Juram et flumen Rhodanum, vix qua singuli carri ducerentur; mons autem altissimus impendebat, ut facile perpauci prohibere possent; alterum per provinciam nostram, multo facilius atque expeditius, propterea quod inter fines Helvetiorum et Allobrogum, qui nuper pacati erant, Rhodanus fluit, isque nonnullis locis vado transitur. Extremum oppidum Allobrogum est, proximumque Helvetiorum finibus Geneva.

2. Multa ab Cæsare in eam sententiam dicta sunt, quare negotio *desistere* non posset, et neque suam neque populi Romani consuetudinem *pati*, uti optime meritos socios desereret, neque se judicare Galliam potius esse Ariovisti quam populi Romani. Bello superatos esse Arvernos et Rutenos ab Q. Fabio Maximo, quibus populus Romanus *ignovisset*, neque in provinciam redegisset, neque stipendium *imposuisset*.

Grammatical Questions.—For those only who take Cæsar.

1. Give the three degrees of all the adjectives in this passage that admit of comparison. (Par. 1.)
2. Parse fully the following words:—*difficile*, *qua*, *perpauci*, *expeditius*, *qui*, *pacati erant*, *isque*. (Par. 1.)
3. Write in full the present indicative and perfect subjunctive of all the verbs in italics. (Par. 2.)
4. What conjunctions require the subjunctive? Give, with the English, short illustrative sentences.

B. VIRGIL.

1. Musa, mihi causas memora, quo numine laeso,
Quidve dolens, regina Deum tot volvere casus
Insignem pietate virum, tot adire labores,
Impulerit. Tantaene animis coelestibus irae?
Urbs antiqua fuit—Tyrii tenuere coloni—
Carthago, Italiam contra Tiberinaque longe
Ostia, dives opum, studiisque asperrima belli:
Quam Juno fertur terris magis omnibus unam
Posthabita coluisse Samo. Hic illius arma,
Hic currus fuit: hoc regnum Dea gentibus esse
Si qua fata sinant, jam tum tenditque fovetque.

2. Diva solo fixos oculos aversa *tenebat*.
Ter circum Iliacos raptaverat Hectora muros,
Exanimumque auro corpus vendebat Achilles.
Tum vero ingentem gemitum *dat* pectore ab imo
Ut spolia, ut currus, utque ipsum corpus amici,
Tendentemque manus Priamum *conspexit* inermes.

Grammatical Questions.—For those only who take Virgil.

1. Give the three degrees of all the adjectives in this passage that admit of comparison. (Par. 1.)

2. Parse fully the following words:—*quo*, *tantaene*, *opum*, *quam*, *hic*, *qua*, *sinant*. (Par. 1.)

3. Write in full the present indicative and perfect subjunctive of all the verbs in italics. (Par. 2.)

4. What conjunctions require the subjunctive? Give, with the English, short illustrative sentences.

ARITHMETIC.

(*Time allowed—from* 12·30 *p.m. to* 2 *p.m.*)

[The working of these questions, as well as the answers, must be written out in full.]

1. A man spends £26 8*s.* every 30 days, and his annual income is £400; how much does he save in a year?

2. Add together $\frac{3}{8}$ of a guinea, $\frac{3}{16}$ of a crown, and $\frac{3}{160}$ of 7*s.* 6*d.*, and reduce the result to the decimal of 16*s.*

3. Find the value of $\cdot 16\dot{3}$ of $2\frac{1}{2}$ miles.

*4. Express approximately in English feet—9 mètres 4 décim. 8 centim.

*5. A farm of 170 hectares is purchased for 500,000 francs; it is resold in three lots: lot 1, 7 hect. 40 ares, at 4000 francs the hectare; lot 2, 50 hect. 25 ares, at 3500 francs the hectare; the remainder at 3000 francs the hectare. How many francs are gained or lost by the transaction?

6. The length of a rectangular field, which contains 4 ac. 3 ro. 14 po. $26\frac{1}{2}$ yd. is 260 yd. 1 ft. 4 in.; what is its breadth?

7. If the gas for five burners, five hours every day, for ten days, cost 4*s.* 3*d.*, how many burners may be lighted four hours every evening, for fifteen days, at a cost of £3 16*s.* 6*d.*?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*)

1. Analyse the following sentence:—"A storm of controversy rose round the volumes, and some of the keenest observers of English life had said at the time, and maintained since, that the publication of the book had made or marked an epoch."

2. Parse fully:—

"To be honest, as this world goes,
Is to be one pick'd out of ten thousand."

3. Correct the following sentences, giving your reasons:—

(i.) He is one of the best men that has ever lived.
(ii.) I saw a young and old man sitting together.
(iii.) Of all others this is best.

4. In the following passage, supply the necessary capital letters, and put in the stops and inverted commas where requisite:—he walked away to where his wife was sitting what time is it whispered catherine looking up at him time to go he returned smiling but she caught the discomposure in his tone and look at once and her wifely heart rose against the squire she got up drawing herself together with a gesture that became her then let us go at once she said where is rose.

†5. Write a short composition on *one* of the following subjects:—(i.) A Summer Holiday. (ii.) The Spanish Armada. (iii.) Obedience. (iv.) Photography.

* At least one of these two questions must be attempted by every candidate.

† This must be attempted by every Candidate.

Pharmaceutical Society of Ireland.

ANNUAL GENERAL MEETING.

(*Concluded from page* 283.)

Mr. Hodgson said he had very great pleasure in proposing the re-election of their worthy President, Mr. Brunker. They all knew how he had thrown himself into the duties that devolved upon him, and those duties had not been slight. The Society were under a deep debt of gratitude to him for the energy and intelligence which he had applied to the discharge of those duties, and for the interest he had displayed in the future well-being of the Society. There were some points in the Bill they had before Parliament that might be modified, but having regard to the broad principle of it, it was a necessity. They could not progress as they wished to do without greater power and greater means. Their means were at present very small indeed; and having regard to their importance as an educational body, a larger income was necessary for them. If the Bill to which the President had devoted so much time and talent should pass in its entirety—which he thought it would—there was no doubt that the Society would be placed on a firm basis, and on one of which they would all be proud. He thought that they could not possibly, in the present crisis in the history of the Society, be in better hands than in those of Mr. Brunker.

Mr. Hayes said he had much pleasure in seconding the vote of confidence which Mr. Hodgson had proposed in the President. He could fully endorse every word that Mr. Hodgson had spoken concerning the ability and the earnest zeal which Mr. Brunker had shown on behalf of the Society. Having been with him in London he was able to see the faith that was put in him by the members of the Committee of the House of Lords, and more especially by the Chairman of that Committee, who had several interviews with him, and knew that he was well made up on the subject that he brought before them. The Society might congratulate themselves, at the present important crisis, on having such a man at their helm as Mr. Brunker to guide with his ability and knowledge the course of the present legislation. Had a false step been taken it might have been fatal to the Society. He felt satisfied that with Mr. Brunker as President for the ensuing year they might hope that their Bill would pass, at all events in such a form as to place the Society on a firmer basis than ever it was before.

Mr. Downes moved an amendment that the question of the election of the President be referred to the Council. He submitted that under the regulations this was the proper course. Mr. Hill might have a sufficient *clientèle* in the Society to put him in the presidential chair against the will of the Council.

Mr. Grindley submitted that Mr. Downes's reading of the Act was erroneous.

The President held that under the Act and regulations the President and Vice-President must be elected at the annual meeting of the Society.

Mr. Hodgson said that in this matter they should all bow to the majority of votes of the Society.

The Vice-President: Certainly; we are willing and ready to do it.

The Vice-President then put the motion for the re-election of Mr. Brunker, and it was unanimously carried amid applause.

The President said he had to return his best thanks for the confidence placed in him. He had had at times to act without instructions, but on every occasion the Council had borne him out in what he thought it necessary to do. He had felt it a great privilege to act for such an important body as the Pharmaceutical Society of Ireland. Up to the present they had been in their infancy, but he believed they would soon occupy a much more important position in the country than they had done heretofore. It had been his pleasure as well as his duty to try to carry to a successful issue that which had so far succeeded; and he hoped that before Christmas the Council would be able to congratulate the Society on being in a stronger position both financially and in every other respect than ever it had been in before, and that from henceforth the prosperity of the Society would continue to grow.

Mr. William Allen said he had much pleasure in

moving that Mr. Draper be elected Vice-President for the ensuing year.

Dr. Montgomery said he had great pleasure in seconding the motion. He had a long knowledge of Mr. Draper, having worked with him from the formation of the Society, as an examiner and otherwise; and he considered that they were fortunate in having Mr. Draper continuing to give the use of his abilities to that large and increasing Society.

Mr. Hill moved in amendment that Professor Tichborne be elected Vice-President. For a great number of years the appointments of the Society had been taken almost exclusively by some gentlemen, and he thought it was time that others should be appointed in their places. Professor Tichborne was in 1883 or 1885 put out of the presidential chair because there was some unwritten or unprinted law of the Society that no President should hold office for more than three years in succession. Since then Professor Tichborne had not been offered any other post; and he (Mr. Hill) thought that these offices should now go round, and not be held in successive years by two gentlemen almost exclusively.

Professor Tichborne: I feel very much obliged to Mr. Hill for his kindness in thinking of me; but I could not possibly next year undertake any duties of the kind, my time will be so fully occupied with other matters. I am equally obliged, however, to Mr. Hill for his good feeling. I believe that the three years' law only applies to the President.

The motion for the re-election of Mr. Draper as Vice-President was then put and carried unanimously.

The Vice-President on returning thanks said it was a pleasure to him to be of any use to the Society. He should have been delighted, however, if his friend Professor Tichborne had accepted the Vice-Presidency.

The next business consisted of notices of motion. The first by Mr. Merrin was as follows:—

> "That this meeting recommends that the £20 hitherto set apart as a subscription to the *Pharmaceutical Journal* be henceforth discontinued, and applied for the purpose of forming a fund for prosecution purposes."

Mr. Merrin said he had had conversations with some members on the subject of this motion, and with the leave of the meeting he would withdraw it.

Mr. Hill said his motion was as follows:—

> "That this meeting recommends that the *Chemist and Druggist* be the future official journal of the Society."

Last week's *Pharmaceutical Journal* contained the report of the Council meeting a week behind the *Chemist and Druggist*. He had been speaking on this subject to a great many licentiates of the Society, and they had said that the *Chemist and Druggist* represented both the trade and the profession, whereas the *Pharmaceutical Journal* did not represent the trade, and moreover did not represent Ireland. The whole of the space was taken up with English matters, and consequently the members of that Society were barred out from enjoying any good from it. The general wish of the members of the Society, he believed, was that the *Chemist and Druggist* should be their official organ. There might be some little difference in the expense, but that was a small matter compared with the benefit which they would derive from having the *Chemist and Druggist* as their official organ. He had written to the editor of the *Chemist and Druggist*, who stated that the journal would be supplied at a cost of 5*s*. per member per annum, and that the 'Chemists and Druggists Diary' would be forwarded free of charge to each member. The *Pharmaceutical Journal*, on the contrary, gave them nothing. Most of the members, when they got it, tore off the cover, and if the date was a week after the meeting of the Council they read it; if not, they pitched it aside.

Mr. Holmes said he had great pleasure in seconding the motion.

The President: Has any gentleman anything to say on this?

The Vice-President: I had better say at once that it would be the biggest mistake we ever made to pass this motion. Did you ever get a favourable article from the *Chemist and Druggist*?

Mr. Allen: Mr. Wootton has worked for some months, if not years, against our present Bill. That ought to be quite sufficient.

The Vice-President: It is a first-class journal, but it is not the journal for us.

The President: I may mention that the circumstance Mr. Hill alludes to as having occurred last week was very exceptional. The reports were sent by the same post to the two journals, and in some way or other the Editor of the *Pharmaceutical Journal* mislaid his copy and had to write for a fresh one.

Mr. Wells: That never occurred before. He (Mr. Wells) could bear testimony to the fact that their meetings were much more fully reported in the *Pharmaceutical Journal* than in the *Chemist and Druggist*. Anyone who compared the two reports would find that the *Chemist and Druggist* cut out part of the report. The rule was that the reports of the Council meetings appeared in the second Journal of the month. That was because it was not possible for the reporter to send the reports in time for the Journal that was published on the Saturday after the Council meeting. Therefore they never appeared until the Saturday week afterwards. Mr. Hill had stated that he was sure that most of the members of the Society did not read the *Pharmaceutical Journal*. He (Mr. Wells) read both journals with pleasure, and he believed that other members of the Society did so also; but most certainly what Mr. Draper had said was true, namely, that the unfavourable remarks that the *Chemist and Druggist* had been making on them for the last year should be quite sufficient to induce the members of the Society not to adopt it as their journal. The journal that they should have to represent them would be one that would to a certain extent go with them; but instead of that the *Chemist and Druggist* opposed them. It had cut up their Bill and had made statements contrary to what the President and the other members of the Council had shown to be the fact. But there was not a member of the Society that did not read it.

The Vice-President: I am very glad to have it and to pay for it.

Mr. Wells: So far as taking the two I am perfectly independent. If I do not get the *Chemist and Druggist* from the Society I will subscribe for it.

Professor Tichborne: I think the name of the *Pharmaceutical Journal* is a very serious item in considering whether we should adopt it as our journal or not. We have no chemists and druggists in the Pharmaceutical Society.

Mr. Hill said the members of the Society outnumbered the Council, and the wishes of the former should be consulted in this matter. Members had several times written to the Council about it, but had always been put off with the reply that the *Pharmaceutical Journal* would be continued. He (Mr. Hill) had never known an instance in which the *Chemist and Druggist* had less about the Society than the *Pharmaceutical Journal*, and the former put headings to paragraphs whereas the latter never did. The *Chemist and Druggist* had also offered to give an Irish supplement. The *Pharmaceutical Journal* had never done anything of that sort.

The President said this matter had been under the consideration of the Council time after time for eight years. The Council had almost unanimously a very strong opinion on the subject. They had from time to time taken into consideration the opinions of the

members outside; and he must confess that up to the present they had not found any such overwhelming opinion on the part of members of the Society in favour of the *Chemist and Druggist* as had been stated to-night. They should remember that the *Pharmaceutical Journal* was the organ of the British Society with which they wished to join hands as much as possible for the promotion of pharmacy in both kingdoms. The Pharmaceutical Society of Great Britain had dealt with them on most favourable terms, supplying 60 copies of the journal weekly for £20 a year, and also paying the postage, which left them a very small balance indeed. That they would continue to do as long as the Society wished; but if the latter said they did not want the Journal, the former would not cry. However the Council would listen to any recommendation from the meeting on the subject.

The President then put the motion, which was negatived by a considerable majority.

Mr. Hill moved—

"That the meeting recommends that the full proceedings of the Council meetings be published, except on special occasions when it is necessary to go into committee."

Up to the present they had only little bits of reports of the Council meetings, such as the President, as arbiter in the matter, wished to give them. They paid £15 per annum for these reports; but the report of last week was such as the Registrar could have easily supplied. That being so, there was no necessity for paying a reporter for such jottings. If they had full reports they would know what was going on; but as it was, they did not know a single thing that was going on. There should be either no report or a full one. He knew that at times it was absolutely necessary to go into committee and keep matters out of print; and then the reporter could be asked to leave the room and come back afterwards.

The President: Does any gentleman second this motion?

The question was repeated, and there was no response.

The President: As there is no seconder to the motion, I may say that what is actually done by the Council is what Mr. Hill proposes, namely, the full proceedings are reported, except on special occasions, when it is necessary to go into committee. That is done from day to day. Mr. Hill appears to have drawn very largely on his imagination as to what goes on in the Council. The report furnished by Mr. Macartney is a full report of the proceedings, and the only elisions made by me are matters which it is not intended should be known even by licentiates of the Society, such as questions connected with law proceedings and names of persons, etc.

Mr. Evans then moved that the marked thanks of the meeting be given to Mr. Brunker for his urbanity in the chair.

Mr. Wells, in seconding the motion, said there was one thing which the members of the Society generally did not know. There was one clause of the Bill they had before Parliament to which the President was totally opposed; but the opinions of the Council being almost unanimously the other way, when the President went to London he put his own opinions in his pocket and put forward the ideas of the Council.

Mr. Downes supported the motion. From what he had seen of Mr. Brunker in the chair that evening and from what he had seen of him in London he was satisfied that they could not have a better President; and in the amendment which he (Mr. Downes) had moved earlier in the evening there was no suggestion that either the meeting or the Council should remove him from that office.

The Vice-President put the motion, which was unanimously carried amid applause; and,

The President, in responding, said that as long as he continued to occupy the chair he should endeavour to act fairly towards everyone who came before him, and be guided by the majority. With reference to the point made by Mr. Wells, he would say that he (the President) fought as hard as any man could for many years for the continuance of the grade of chemist and druggist; but when he saw that he was beaten he followed the opinions of the majority of the Council. Any opinions, however, that he ever had on the subject had been fully satisfied by the concession which had been made. But as representing not only the opinion of the majority of the Council but also his own opinion, he would oppose any further extension of the grade of chemist and druggist beyond what was provided for in the present Bill.

The proceedings then terminated.

MEETING OF THE COUNCIL.

The stated monthly meeting of the Council of the Society was held at 3 o'clock on Wednesday, October 3.

The President (Mr. Brunker) occupied the chair.

There were also present: Messrs. Draper (Vice-President), Allen, Evans, Hodgson, Beggs, Merrin, McCormack, Smedley, Hayes, Simpson, Wells and Dr. Collins, Dr. Montgomery, and Dr. Tichborne.

It was moved by Mr. Allen, seconded by Dr. Collins, and resolved—

"That Mr. Hodgson be re-elected Treasurer."

Moved by Mr. Draper, seconded by Dr. Collins, and resolved—

"That Messrs. Hayes and Simpson be requested to continue in their places as auditors."

Moved by Mr. Allen, seconded by Mr. Beggs, and resolved—

"That the Law Committee be the same as last year, substituting Mr. Merrin's name for that of Mr. Payne."

Moved by Mr. Evans, seconded by Mr. Allen, and resolved—

"That the Committee to inspect candidates' certificates be re-appointed, substituting Mr. Lane McCormack's name in place of Mr. Payne's."

The Council then received a joint deputation from the Chemists' and Druggists' Association of Ireland (Dublin Branch), and the North of Ireland Chemists' and Druggists' Association, *re* the Pharmacy Act Amendment Bill.

The deputation consisted of Mr. Boyd, Sir James Hazlett, Mr. McKnight, Mr. Rankin, etc.

The President: We have received a communication, gentlemen, saying that you have some views which you wish to lay before this Council. We will now be glad to hear what you have to say.

Mr. Boyd: The delegates have asked me to present to you their views to-day, but before proceeding to do so in detail to ascertain from you whether the report is true which they have heard that the President of the Association has stated that he is determined to force the Bill through in its present state. They think it would be quite useless to explain their views if that is the case, and so before going further, we would be glad to know whether it is so or not.

The President: In reply I can only say that the letter addressed to us was to the effect that the deputation was thought of in consequence of a remark I made at a meeting of the Council that we were quite ready to entertain any suggestion which did not interfere with the principle or efficiency of the Bill. The matter now remains in the same condition; and I have not made any statement that the Bill will be forced through in its present state. We have already made great concessions, and the Council will try to get the Bill through, as nearly as possible, in its present shape, but will oppose anything affecting the principle of the Bill.

Mr. Boyd: The next question I have been asked to put is, whether the formation of the second grade is considered an essential part of the Bill.

The President: There are two principles to which the Council must adhere. In the first instance, certain persons have their rights preserved by section 31 of the original Act; they will be compelled to register. The second principle is, that from a certain date the door shall be closed to any such persons. The extension of the power to register has been carried on from 1875 to the present date; and further than that, after the very large concessions which the Council has made, I do not think it will be prepared to go.

Sir James Hazlett: Speaking for the North of Ireland Association, I may say that after that expression of opinion we need hardly proceed any further.

Mr. McKnight concurred.

The President: I can only express the regret of the Council that you have had the trouble of coming here; however, it is not our fault, because undoubtedly the letter that the Registrar received on the subject was founded upon a resolution which stated, "Having seen that the Council is prepared to accede to any reasonable amendments not inconsistent with the principle of the Bill, we hereby instruct the Secretary to ask that they will receive a deputation at an early date." Now this we look upon as a principal part of the Bill.

Sir James Hazlett: Coming from Belfast, I say it was not inconsistent with the principles of the Bill that the two grades should be made perpetual. Otherwise you should wipe them out at once, and it is with the view of preserving the character of the Pharmaceutical Society, with the view of preserving efficiency and of maintaining the necessary supply for the country, that I think they should be perpetuated.

Mr. McKnight: Clause 15 of the original Bill provides by the formation of the first Council, of a second grade——

The President: Excuse me. The point is one that has been threshed out over and over again before the Committee of the House of Lords and elsewhere, and that which the Society was empowered to form is not such a grade as you now desire. Had we adopted two grades they would both have had equal rights. The Council does not see its way to have two such classes, and I think wisely.

Sir James Hazlett: In meeting you here we may say that we thoroughly appreciate the legal difficulty that arose, and we do not desire to have them upon parallel lines or equal in their powers or rights.

The President: This question is not new to the Council. It has been hammering at the subject for eleven years, and we are now perfectly unanimous in our view, that considering the large number which will be registered under the 31st section of the Act of 1875 and the large number that have gone into business since and their apprentices and assistants, every legitimate want in the country will be supplied until we are prepared to supply their places with fully-qualified licentiates of the Pharmaceutical Society. I think those gentlemen who attended in London must say that we tried in every possible way to meet their objections short of abandoning the principle of the Bill by which the Council is determined to stand—the termination of the existence of the lower grade. I do not know how many the number at present in business is, but if you take into account the number of apprentices and assistants entitled to go in for the examination, I do not think you will say that the people of this country will want poison-sellers for many a year. This only touches a little of the business of the druggist—it only affects it in the sale of scheduled poisons. If there is any other point you wish to put before the Council we shall hear you now.

Sir James Hazlett: If you cannot see your way to entertain this it is perfectly useless to go farther. There were some other matters which we wished to explain, but in the face of your statement, we do not see that anything could be gained by going into them.

Mr. Rankin: The Council make a great mistake——

The President: Pardon me. You have come to lay your views before the Council and not to lecture the Council. I thought you had decided not to go any further. But perhaps this is another point you wish to speak on.

Mr. Rankin: Yes.

The President: I understood from Mr. Boyd you thought there was no use in discussing any other point.

Sir James Hazlett: Just so, there is no use in doing so. We thank you very much for your courtesy in receiving us. Of course now you understand we will fight the thing to the bitter end.

Mr. McKnight: And we think it is in the interests of the public we are doing so.

The President: I do not think so.

The deputation then withdrew.

A letter was read from the Pharmacy Board of New Zealand, and the Technological Museum of New South Wales, acknowledging receipt of the Calendar of 1888.

A letter was also read from the Privy Council approving of the alteration of hour for the annual meeting, the President observing that the last was the largest meeting which had been held.

The Secretary was directed to reply to a letter from Mr. S. R. Henry, asking the Council to forego the new practical chemistry rule in his case in consequence of illness, expressing regret that the matter was one with which the Council had no power to deal.

The Secretary was instructed to acknowledge donations from the Alumni Association, Philadelphia College of Pharmacy, of annual report, and of supplement to the Australian Museum Report, 1887, from the Technological Museum, Sydney.

Mr. Brunker moved—

> "That, in consequence of the numerous fatalities arising from improper use of carbolic acid, whether taken by accident or with suicidal intent, this Council should make another effort to have this substance included in Part II of Schedule A of the Poisons Act. That a memorial to that effect, sealed with the seal of the Society, be presented to the King and Queen's College of Physicians, and that that body be also urged to press for a provision in the law requiring carbolic acid and other poisons to be kept and retailed in bottles of a distinctive shape."

The President said the Council would fail in its duty if it did not try to have carbolic acid included in the schedule of poisons. In 1882 the College of Physicians was asked to suggest to the Privy Council that it should be included in the second part of Schedule A of the Poisons Act. The College agreed to that suggestion, but the Privy Council—for what reason he did not know—refused. There were now almost daily reports of fatalities arising from the improper use of carbolic acid, and it was right the Council should show it was quite alive to the dangers to which the public are exposed. Everyone who knew anything about pharmacy was aware how careless the public were about medicines and lotions, and the time was come for the Legislature to impose some restrictions.

Dr. Collins said he approved of the resolution, but he recollected that one of the most influential members of the College of Physicians objected on the ground that it would be substituting the sense of touch for the sense of sight.

Mr. Draper seconded the resolution. He did not think there was any difference of opinion.

Mr. Evans: Would it not be better to add other things and to mention them definitely?

The President: The Privy Council will not include the mineral acids; they say it will interfere with the

manufacturing industries of the country. But carbolic acid is only sold for medicinal or quasi-medicinal purposes. It is most extraordinary that it has been selected recently for the purpose of committing suicide.

The resolution was adopted.

It was resolved on the motion of Mr. Hayes, seconded by Mr. Draper,—

"That the Council regrets the resignation of Mr. Payne of his seat, and desires to express its sense of the valuable services he has rendered in the past to the Society."

Mr. John Joseph Eggleston, L.P.S.I., of the Medical Hall, Kanturk, and Mr. Joseph Stewart, L.P.S.I., 7, Bedford Row, Limerick, were elected members.

Mr. Robert Duggan, L.P.S.I., 6, Duke Row, Summer Hill, Dublin, was nominated for membership.

The proceedings then terminated.

October Examinations.

Preliminary:—Messrs. Adamson, Mulreany (Hall and Wilson—equal), and Riordan passed. Three were rejected.

License:—Messrs. Devlin, Flood, Nethery, Lilley and Foley passed. Four were rejected.

British Pharmaceutical Conference.

TWENTY-FIFTH ANNUAL MEETING.
SECOND DAY'S PROCEEDINGS.

Wednesday, September 5.

(*Continued from page* 264.)

The following two papers were then read and discussed together:—

Carthagena Bark.

BY DAVID HOOPER.

Some of the cinchona barks are known by the names of the localities in which they are collected, others are named from the ports whence they are distributed, and perhaps none of these barks has been less noticed than that bearing the name of Carthagena in the United States of Colombia. As the botanical source of this bark will very probably be cleared up at an early date, it would be interesting in the meantime to link together historical facts on the subject, and to give the results of the experiments connected with the introduction of the Carthagena bark trees into the Nilgiri Cinchona Plantations of the Madras Presidency.

José Celestino Mutis, at the request of the Spanish Viceroy, was the first botanist sent out to explore the bark region of New Granada,* and discovered the first cinchona tree at Teena, in the year 1772. A few years later, Ruiz and Pavon were sent round to Peru to investigate the bark regions of that country, and a hot discussion sprang up between the botanists as to the respective merits of the species they had discovered in the two countries. It would indeed seem that Mutis was not acquainted with the more valuable species of cinchona, as the large quantities of bark that were subsequently exported from Carthagena and Santa Martha were found to be so worthless that the barks of New Granada were brought into disrepute.

The distinguished traveller, Alexander von Humbolt, with Aimé Bonpland, visited the ports of the Caribbean sea in 1801, and expresses an interest in the bark trade of South America. He says: "The proximity of the port of Carthagena would render the neglected cultivation of cinchona an object of great importance to European trade. The real febrifuge cinchona with the hardy corolla is nowhere else found so near the coast, if we except the Sierra Nevada of Santa Marta." Whatever might have been the value of the barks exported at this time, the trade was considerably brisk; it is shown in the Report of the Administrator that between 1802 and 1807 the shipment of New Granada bark from Carthagena was 3,340,000 lbs., and the first arrivals in Spain sold at 5 to 6 dollars a pound.

Dr. Karsten, a German botanist, arrived in South America in 1844, and during a long residence examined the cinchona trees of New Granada, and determined the origin of several barks exported from the northern towns. He found *Cinchona lancifolia* of Mutis to be a very variable plant, and to furnish barks of very different appearance. This species, he says, affords principally two kinds of barks, the valuable variety called Soft Colombian, or Calisaya, of Santa Fé, and the less valuable variety, called Carthagena, or Cogueta bark, or Carthagène ligneux of the French. Other investigators refer the latter bark to the species named by Mutis, *C. cordifolia*, a tree largely distributed in South America, and considered to be very poor in alkaloids. The *quina anaranjada* from *C. lancifolia* was exported very largely between 1849 and 1855, but after that time the supplies began to fail. About the year 1872 Colombian barks were again in the market, and 12 cwt. was shipped to Europe from Carthagena and neighbouring ports, but the bark trade at this time ceased to be characterised by one or two special kinds, as the Pitayo forests had been recently explored by travellers, and quantities of bark from this district formed the bulk of the exports. Within the last decade Remijias have been discovered in the forests of Colombia, and cuprea barks have taken the lead in the commerce of that country; in 1881, for instance, out of 87,000 serons exported, 60,000 serons were cuprea bark.

The United States of Colombia at the present time probably yield the greater portion of the South American cinchona bark of commerce. The cuprea bark comes from low elevations at Antioguia in the north-west, from the basin of the lower Magdalena in the north, from Bucaramanga and Llanos on the eastern slopes of the eastern Cordillera, and from near the several affluents of the Orinoco and Amazon. The mountainous territory in the south-west affords the Pitayo bark and the Calisaya of Santa Fé, and includes the habitat of the Carthagena bark trees. In nearly every part of the country, from 9000 feet on the three branches of the Colombian trifurcation of the Andes, down to river basins a little above sea-level, are numerous rubiaceous trees more or less valuable as quinine producers. The bark from this country is not all exported from Carthagena, but this port still holds an important position in the trade. In the consul's report on the trade of Carthagena for the year 1887, 138,000 pounds of cinchona bark were passed out, together with some drugs of less importance, as balsam, ipecacuanha, and sarsaparilla.

Mr. Robert Cross was employed in 1877–1878 to collect plants of the Calisaya Santa Fé on the eastern Andes and of the Carthagena bark on the Central Cordillera. This intrepid traveller and accomplished gardener made a successful journey through Cali and Popayan, over the western and central Cordilleras, and returned with cuttings and seeds of the plants for which he went in search. He defined the Carthagena bark region as situated on the eastern declivities of the central Cordillera on the border of the Magdalena Valley in the district of Paez, a little below 3° north latitude. The tree grows at elevations of from 4000 to 8000 feet in forests with a heavy rainfall. It is rapid and robust in habit, and stands great variations in temperature. Five specimens of bark were collected

* In 1819, after the war with Spain, Colombia was proclaimed a republic. In 1831 the Confederation resolved itself into three independent states, New Granada, Venezuela, and Ecuador. In 1861 the former was rechristened Colombia, with Bogota as chief town.

from trees in the Cauca Valley, and one from Coralis Inza in the district of the Magdalena, and the latter was the only one that was found to contain quinine. The analyses of the six samples by Mr. J. E. Howard might here be conveniently reproduced.

	1	2	3	4	5	6
Quinine . .	·00	·00	—	·00	1·88	·00
Cinchonidine	·00	·46	—	·28	1·18	·00
Quinidine .	·00	·00	—	·00	·18	·00
Cinchonine .	1·23	1·25	—	1·30	·80	1·24
Amorphous alkaloids .	1·68	1·97	—	2·18	·71	1·48
Total . .	2·91	3·68	0·44	3·76	4·75	2·72

No. 1. Paniquita variety, Popayan. 5000 feet, valley of the Cauca.

No. 2. Paniquita variety, Usenda. 8500 feet, district of the Cauca.

No. 3. Smooth leaved variety, Pueblo Nuevo. 8000 feet, district of Cauca. Mr. Howard remarks this is the *Quina blanca* of Carthagena, and does not belong to the Cinchona, but to an allied family.

No. 4. Paniquita variety, Silvia. 7500 feet, district of the Cauca.

No. 5. Magdalena variety, Coralis inza. 7000 feet, district of the Magdalena.

No. 6. Paniquita variety. 6000 feet, district of the Cauca.

The plants were taken to Kew, arriving there in March, 1878, and forty cuttings were obtained from the root pieces of the plants; much difficulty was experienced in preserving the Magdalena plant, owing to the frost of the following winter and to the cockroaches feeding upon it. Next year the young plants were brought to India, and six carthagenas were planted out on the Nilgiris, in October, 1880. The high elevation of Dodabetta was unsuited to their habit and growth, but two plants at Naduvatam found a more genial climate, and even now thrive most luxuriantly. Colonel Beddome reporting on the plantations in June, 1881, remarks: "The two plants brought lately by Mr. Cross from the central cordillera near Bagota (elevation 4000 to 6000 feet), are healthy and strong growing, and are being propagated. The prospects of establishing it on the Nilgiris is promising. It is supposed to be a strong growing and large tree, which its present appearance does not belie; its yield in quinine is much the same as that of succirubra, and it will probably succeed in the same localities as that species." Mr. Cross tells me that he believes the "China Cuprea" from Bogota is the same species. In 1884 they flowered and seeded, and in the same year 400 young plants were put out and grew rapidly.

One of the trees planted by Mr. Rowson in Ossington Estate, Naduvatam, was cut down and uprooted last year; it had been growing in a poor soil with a southern aspect, and was five and a half years old.

This year some bark was taken from an original tree six years old, on the Government Plantation, and examined with the other specimens, with the following results:—

	Government Stem-bark.	Ossington Stem-bark.	Ossington Root-bark.
Quinine	—	—	1·10
Cinchonidine	·40	·22	·55
Quinidine	—	—	·36
Cinchonine	1·64	1·60	1·77
Amorphous alkaloid .	1·51	1·33	·62
	3·55	3·15	4·40

The appearance of the bark was not very different to that of other species; the outer surface was marked by transverse rings at rather regular intervals and warty exuberances. The powder of the stem, and especially of the root-bark, was decidedly more yellow than other kinds of cinchona. Although this bark is known in some quarters as "hard Carthagena," no particular hardness was noticed in the small sample from the locally cultivated trees; if the hardness depends upon the heaviness the name would not apply to this bark, as the specific gravity of some of the powder showed it to be like the cuprea, lighter than the red and crown barks. The analyses, however, are of the most importance, and these show the bark to have the same composition as those brought by Mr. Cross from Usenda and Sylvia in the district of the Cauca, and analysed by Mr. J. E. Howard in 1878.

It is very evident that this variety of Carthagena bark, now being cultivated on the Nilgiris, is a very useless one commercially, and that the better kind, brought from the Magdalena valley, never reached India at all, or was one of the plants that was unsuited to the climate and died. Now we know of the little value of this species, its propagation will not be continued, a few trees only will be reserved for botanical identification and future chemical investigation. In the first analysis of the root bark the small quantity of alkaloid named quinine appeared to have some of the properties of homoquinine, an alkaloid found in cuprea bark, but further tests on a larger scale showed it to be chemically and physically identical with quinine. Cinchonidine was also readily detected in each sample, and as the absence of this alkaloid constitutes a perfectly distinct character of the Remijias, it is very clear that the barks above examined are from a separate species of cinchona from any of those hitherto introduced into India.

In concluding this paper I must acknowledge the use I have made of the works of Markham, Howard, Kaisten, Triana, Humbolt, Cross, Flückiger, Van Gorkum, the Reports of the Madras Government, and the statistical notices of the cinchona trade in the *Pharmaceutical Journal* and *Chemist and Druggist*.

The Hybridisation of Cinchonas,

BY DAVID HOOPER, F.C.S., F.I.C.,
Government Quinologist.

The hybridisation of plants belongs to the department of vegetable physiology, and when plants contain alkaloids and principles which admit of precise quantitative determination, the processes of Nature might well be studied from a chemical point of view. Cinchona hybrids have received a great deal of attention from a number of botanists, and without reproducing the different conclusions arrived at, and only using botanical terms sufficient for explanation, I intend to treat the subject in the light of the chemical analysis of the barks.

There are two well-defined species of Cinchona on the plantations of the Madras Government, the one is *C. succirubra* (Pavon), yielding red bark, and the other *C. officinalis* (Hooker), yielding the crown bark of commerce. Between these two species, many hybrid barks are recognized, and have been cultivated and exported to a very large extent from this country, and the time has come when their nature should be thoroughly investigated. The facility with which these plants made their appearance on the estates seems to imply that forms of cinchona were produced that were more adapted to the climate and situation of their adopted country than the parent forms brought originally from South America. Those having a greater vigour of growth should be propagated, as the robust habit is usually indicative of a richer bark. Hybrids assume the quick growing character of the succirubra, yet they contain a greater proportion of quinine than that species. They do not as a rule contain the percentage of quinine usual to officinalis, but the large quantity of bark yielded by the tree, and the high total alkaloids, make them equal in value to the best crown barks.

It will first be necessary to discuss the alkaloidal com-

position of the two species between which hybridisation on the plantations has taken place, and for this purpose the analyses of natural stem bark will be quoted, excluding branch, root, and all barks submitted to artificial treatment. *Cinchona succirubra* has a peculiar centesimal arrangement of alkaloids in its bark varying between certain limits. In the following table it will be seen that in fifty selected barks the quinine ranges from 17 to 27 per cent., cinchonidine from 26 to 51 per cent., cinchonine from 17 to 47 per cent., and amorphous alkaloids from 4 to 23 per cent.; besides these the alkaloid quinidine occurs in traces in red barks, and occasionally reaches 0·5 per cent.

Composition of Alkaloids in Red Barks.

	Quinine.	Cinchonidine.	Cinchonine.	Amorphous Alkaloids.
1	17·6	43·4	29·4	9·6
2	17·8	35·3	38·3	8·6
3	18·0	39·8	34·5	7·7
4	18·3	29·8	43·1	8·8
5	18·9	51·7	25·4	4·0
6	19·0	27·0	42·0	12·0
7	19·2	33·3	38·7	8·8
8	19·4	30·7	40·1	9·8
9	19·6	48·4	26·4	5·6
10	19·7	36·6	37·3	6·4
11	20·0	27·0	46·0	6·1
12	20·0	30·0	40·0	10·0
13	20·3	41·4	26·8	11·5
14	20·4	36·7	32·4	10·5
15	20·6	33·9	32·6	12·9
16	20·9	42·9	29·1	7·1
17	21·3	42·1	21·5	15·1
18	21·4	26·5	42·6	9·5
19	21·5	35·6	24·9	18·0
20	21·6	37·1	26·7	14·6
21	21·6	34·3	37·3	6·8
22	21·9	34·7	31·5	11·9
23	22·1	34·9	29·7	13·3
24	22·2	36·6	33·4	7·8
25	22·2	36·8	23·1	17·9
26	22·4	35·4	30·0	12·2
27	22·4	32·6	32·8	12·2
28	22·6	35·4	35·4	6·6
29	22·7	39·3	23·0	15·0
30	22·7	44·5	28·8	4·0
31	23·0	41·0	27·5	8·5
32	23·1	26·1	35·7	15·1
33	23·1	33·7	34·2	9·0
34	23·5	42·3	18·2	16·0
35	23·5	28·3	24·4	23·8
36	23·5	38·6	27·9	10·0
37	23·7	36·2	26·1	14·0
38	23·9	36·5	25·4	14·2
39	24·4	35·4	31·0	9·2
40	24·5	37·1	32·9	5·5
41	24·7	36·9	32·1	6·3
42	24·8	37·7	27·7	9·8
43	25·2	36·6	29·0	9·2
44	25·6	37·3	29·2	7·9
45	25·6	29·2	30·0	15·2
46	25·6	27·4	32·8	14·2
47	26·0	41·3	21·1	11·6
48	26·3	38·3	17·6	17·8
49	26·4	35·4	28·0	10·2
50	26·8	44·3	22·8	6·1
Average	22·2	36·1	30·9	10·8

The average of the fifty total alkaloids is 6·25 per cent. The British Pharmacopœia, 1885, directs that "it should yield between 5 and 6 per cent. of total alkaloids, of which not less than half shall consist of quinine and cinchonidine." Reference to the table shows that, with the exception of five samples, all are official barks; Nos. 4 and 11 were sent from the Wynaad, No. 6 was taken from one of the oldest trees on the plantation, No. 18 came from Ceylon, and No. 32 from Travancore; of these five none fall seriously below the Pharmacopœia standard, and all yield over 6 per cent. of total alkaloids. Most of the barks were taken in strips, but Nos. 25, 34, 47 and 48 were taken by the shaving process, and although shavings are not in accordance with the official description, they are rich in alkaloids and exhibit a remarkable decrease in cinchonine. During the discussion on the present Pharmacopœia, a critic remarked that the test admitted barks containing 2½ per cent. of quinine, and ½ per cent. of cinchonidine, or those containing ½ per cent. of quinine, and 2½ per cent. of cinchonidine with 3 per cent. of other alkaloids, but it would be very surprising to find such an erratic composition in any one kind of cinchona that I am acquainted with.

By taking the average composition of the alkaloids, and calculating from the average yield of total alkaloidal contents, we arrive at the composition of a typical succirubra bark.

Type of a Succirubra.

Quinine	1·40
Cinchonidine	2·25
Cinchonine	1·92
Amorphous Alkaloids	·68
	6·25

Cinchona officinalis has quite a different arrangement of alkaloids in its bark, which, like the former, are found within certain limitations. In the following table of analyses made on selected barks, nearly all from the Nilgiris, the quinine ranges from 48 to 62 per cent., the cinchonidine from 18 to 33 per cent., the quinidine from 0 to 6 per cent., the cinchonine from 2 to 16 per cent., and amorphous alkaloids from 4 to 13 per cent.

Composition of Alkaloids in Crown Barks.

	Quinine.	Cinchonidine.	Quinidine.	Cinchonine.	Amorphous Alkaloids.
1	48·2	26·7	—	16·1	9·0
2	50·2	30·5	—	12·5	6·8
3	50·4	31·5	1·5	6·8	9·8
4	50·5	24·5	—	14·3	10·7
5	51·4	29·1	3·0	7·2	9·3
6	52·1	28·0	—	10·1	12·8
7	52·2	25·6	3·1	12·8	6·3
8	52·2	24·4	3·0	9·6	10·6
9	52·4	30·3	—	8·1	9·2
10	52·4	31·6	—	6·6	9·4
11	52·7	30·3	1·4	7·8	7·8
12	53·3	26·0	5·3	7·4	8·0
13	54·2	26·2	3·4	11·0	5·2
14	54·6	26·1	2·0	10·9	6·4
15	54·7	26·5	2·0	5·6	11·2
16	55·0	26·7	1·9	6·7	9·7
17	55·1	26·9	—	9·4	8·6
18	55·2	25·6	1·9	7·9	9·4
19	55·5	27·0	—	9·2	8·3
20	55·5	29·3	·5	8·7	6·0
21	55·8	23·1	1·5	7·8	12·8
22	56·0	25·8	—	11·7	6·5
23	56·0	18·6	—	13·0	12·4
24	56·0	24·9	tr.	11·1	8·0
25	56·3	28·5	1·4	8·0	5·8
26	56·3	25·1	—	7·4	11·2
27	56·4	21·5	—	16·7	5·4
28	56·5	28·1	4·1	7·9	3·4
29	56·6	25·0	2·1	4·2	12·1
30	56·6	28·8	1·0	4·7	8·9
31	56·8	27·4	1·7	6·6	7·5
32	56·8	27·6	·8	9·5	5·3
33	56·9	26·4	1·6	6·6	8·5
34	57·0	20·8	—	14·6	7·6
35	57·3	27·9	·9	3·6	10·3
36	57·4	25·6	2·9	7·1	7·0

	Quinine.	Cinchonidine.	Quinidine.	Cinchonine.	Amorphous Alkaloids.
37 . .	57·8	26·7	2·2	6·1	7·2
38 . .	57·8	26·6	2·3	6·1	7·2
39 . .	58·0	28·1	2·1	5·4	6·4
40 . .	58·4	29·2	2·3	5·0	5·1
41 . .	58·6	28·6	2·5	5·3	5·0
42 . .	58·8	24·8	2·4	4·0	10·0
43 . .	59·4	26·0	1·5	3·9	9·2
44 . .	59·8	27·9	—	4·7	7·6
45 . .	59·9	33·2	—	2·0	4·9
46 . .	60·0	29·1	2·2	2·2	6·5
47 . .	60·1	25·4	1·0	8·5	5·0
48 . .	60·9	26·9	1·4	5·8	5·0
49 . .	61·6	22·2	4·7	4·8	6·7
50 . .	62·1	25·0	2·2	3·5	8·1
Average	55·9	26·7	1·5	8·0	7·9

The crown barks in this table give an average of 5·25 per cent. of total alkaloids, hence the composition of a typical officinalis is thus represented:—

Type of Officinalis.

Quinine	2·93
Cinchonidine	1·40
Quinidine	·08
Cinchonine	·42
Amorphous alkaloids	·42
	5·25

In Sach's 'Botany,' under "Hybrids," it is stated, "The characteristics of the parent forms are, as a rule, transmitted to the hybrid, that the influence of both is manifested in all its characters, producing a fusion of the different peculiarities." If this fusion applies to the outward appearance of the hybridized plants, it should also apply to the organic principles contained in them. By calculation from the two types of cinchonas, we arrive at the theoretical composition of the alkaloids in the hybrid bark.

Type of Hybrid.

Quinine	2·16
Cinchonidine	1·82
Quinidine	·04
Cinchonine	1·17
Amorphous alkaloids	·56
	5·75

The theoretical type of hybrid differs in some particulars, however, from actual analyses of average specimens; there is less cinchonine present; the principal alkaloids are quinine and cinchonidine, one or the other predominating, but in no instance in such a high ratio as in the species; and lastly hybrids have a larger amount of total alkaloids than is shown in the above calculated type.

There are two kinds of hybrids known on the estates at Naduvatam, named *magnifolia* and *pubescens;* the former resembles somewhat in external appearance the *officinalis*, the latter has the peculiarities of growth of a *succirubra*. The following twenty-five analyses are selected from a large number to show the centesimal composition of the alkaloids of the two varieties.

Hybrid Barks.	Quinine.	Cinchonidine.	Quinidine.	Cinchonine.	Amorphous Alkaloids.
1 Pubescens .	55·3	32·2	—	4·2	8·3
2 „ .	50·6	35·1	tr.	6·0	8·3
3 „ .	48·0	41·6	·7	5·6	4·1
4 „ .	47·4	39·0	·6	7·2	5·8
5 Magnifolia	47·4	39·6	—	3·1	9·9
6 Pubescens .	46·0	41·4	—	5·3	7·3
7 Magnifolia	43·5	39·1	·8	8·4	8·2
8 „	43·2	39·8	—	9·0	8·0
9 „	43·2	38·8	tr.	9·5	8·5
10 „	43·0	37·3	—	9·5	10·2
11 Magnifolia	43·0	44·4	—	3·2	9·4
12 Pubescens .	42·6	30·2	5·2	19·0	3·0
13 „ .	41·1	33·0	—	19·3	6·6
14 Magnifolia	40·6	47·4	—	3·3	8·7
15 „	40·2	40·9	—	10·3	8·6
16 „	39·4	34·3	1·5	12·9	11·9
17 „	39·3	35·4	2·0	17·5	5·8
18 „	36·9	51·8	—	6·6	4·7
19 „	36·8	40·8	—	13·2	9·2
20 „	36·1	48·9	—	6·0	9·0
21 „	35·6	50·6	—	6·6	7·2
22 „	34·5	35·1	2·2	19·2	9·0
23 „	33·1	44·7	—	15·4	6·8
24 „	31·0	50·9	—	12·4	5·7
25 „	30·8	51·2	—	9·8	8·2
Average . .	41·2	40·9	0·5	9·7	7·7

The above analyses were made on the natural bark of individual trees from 7 to 16 years of age, and they are arranged according to their value in quinine, which occurs from 55·3 to 30·8 parts per 100. The figures for cinchonidine more or less increase with the decrease of quinine; these two alkaloids together form four-fifths of the whole. The quinidine as a rule is found in those barks in which the quinine predominates, and in that kind called pubescens. With regard to the less valuable alkaloids, it is very satisfactory to notice their deterioration in the hybrids compared with the species; the cinchonine is seen to be in the same small proportion peculiar to the crown bark, and the amorphous alkaloids, commercially regarded as worthless, are much lower than in the red bark.

The arrangement of the analyses according to the percentage of quinine shows how the hybrids take up an intermediate position between the succirubra and officinalis. The highest amount of quinine in the succirubras is the lowest in the hybrids, and the highest in the hybrids merges into the lowest in the officinalis. This illustrates the complete fusion that takes place in the alkaloids of the barks through the process of species-hybridization.

Several plots at Naduvatam are devoted to the cultivation of hybrids, and the plants, as might be expected, are of many varieties. About 70 per cent. are forms of hybrids previously noticed and the remaining 30 per cent. is a mixture of the two parent species and a few other new strains. A few analyses of barks from selected trees of five years of age will show the variety of forms raised from hybrid seed.

Character of trees.	Quinine	Cinchonidine.	Quinidine.	Cinchonidine.	Amorphous Alkaloids.	Total.
1 Hybrid	3·32	2·99	—	·41	·49	7·21
1a „	2·58	2·91	—	·43	·63	6·55
2 „	·87	·98	·13	2·96	·70	5·64
2a „	·90	2·75	—	1·05	·40	5·10
3 Officinalis	2·85	1·11	·11	·46	·35	4·88
4 Succirubra	·85	1·24	·15	2·79	·57	5·60
5 Officinalis	3·10	1·88	·09	1·17	·56	6·80
6 Succirubra	1·35	2·67	—	1·36	·96	6·34

No. 1. Height 9 feet. Girth 6 inches. Leaves broadly ovate, crumpled, glabrous, dark green, glossy above, strongly pubescent beneath, 6 × 4 inches, base rounded or slightly produced on the leaf-stalk.

No. 2. Height 10 feet. Girth 6½ inches. Leaves 8 × 4½ inches, ovate, flat, glabrous above and beneath, as also the young shoots, dark green, shining base, rounded or slightly produced.

No. 3. Approaching the officinalis type. Height 9 feet. Girth 8 inches. Leaves 5 × 3 inches, very broadly ovate, dark green, shining above, glabrous on both surfaces, base rounded, scorbiculæ on upper surface prominent.

No. 4. Approaching the succirubra type. Height 8 feet. Girth 7 inches. Leaves broadly ovate, shining above, slightly puberulous beneath, dark green, crumpled, produced at the base.

No. 5. Approaching the officinalis type. Height 9 feet. Girth 5½ inches. Leaves 4 × 1¼ inches, lanceolate, narrow, perfectly glabrous, dark green glossy, folded inwards upon the upper surface, leaf-stalk reddish.

No. 6. Approaching the succirubra type. Height 10 feet. Girth 8 inches. Leaves and young shoots pubescent. Leaves 10 × 8 inches, light green, variable in size, crumpled, base scarcely produced.

The two barks marked "1" and "1a" are in appearance like the pubescent hybrid, and their analysis confirms to some extent the resemblance in that they contain a large proportion of quinine and cinchonidine in their alkaloids. Nos. 2 and 2a have the habit of the magnifolia hybrid, but the presence of quinidine and the large amount of cinchonidine and cinchonine respectively, indicate new features in the alkaloidal composition that might be referred to new forms produced by hybridisation. Nos. 3 and 5 are the broad-leaved and narrow-leaved officinalis, and are very characteristic in their analyses. Although the latter is the richer of the two it is superseded in quinine and totals by the first pubescent hybrid. Nos. 4 and 6 are the dark- and light-green-leaved varieties of succirubra. The analysis of the former corresponds throughout with the glabrous hybrid No. 2, while the analysis of the latter reveals a composition almost identical with the true type of the Nilgiri succirubra. In the plot where these barks were collected it was noticed that the trees of the parent forms flowered and seeded sooner than the hybrids, but on the other hand the hybrids were more vigorous in their appearance and had more foliage than the species; this, perhaps, is in confirmation of a botanical law that in hybrids the growth is strong but the sexual functions are weak.

Before concluding the subject some analyses might be quoted of hybrids grown in the Bengal Government Cinchona Plantations at Mongpoo, near Darjeeling, at 3500 feet elevation. The results are very interesting in showing the difference between hybrids from foreign localities grown in the same situation. The three kinds were from trees raised from seed from Jamaica, the Nilgiris and Mongpoo, and each sample was taken in strips from about forty trees of varying types. Mr. J. A. Gammie, in sending the samples, says, "Here at Mongpoo our own type of hybrid yields quite double the bark that the Nilgiri type does, whilst it in its turn yields double as much as the Jamaica sort. Perhaps on the Nilgiris our type would be the poorest of the three. The Nilgiri and Jamaica plants approach much nearer than ours to the officinalis, a species that is a failure with us."

	Jamaica.	Nilgiris.	Mongpoo.
Quinine	2·22	2·47	2·02
Cinchonidine . . .	1·93	1·98	2·50
Quinidine	——	——	·17
Cinchonine	·75	·58	·66
Amorphous alkaloids	·64	·59	·31
	5·54	5·62	5·66

In this case it would be misleading to place much importance upon the analysis of the bark alone, as the samples are pretty equal in value, considering their content of alkaloids; but, taking into account the fact that the Mongpoo hybrid yields so much more bark than the others, it would, of course, be more remunerative to cultivate this variety in the Himalayan plantations.

In a future report to the Conference I hope to be able to give the results of a large number of analyses of the Ledger hybrid, a cross between two species of cinchona, the *C. Ledgeriana* and *C. succirubra.*

The PRESIDENT, in proposing a vote of thanks to Mr. Hooper, said the Conference might be congratulated on being the medium of the publication of two such valuable papers.

Mr. GROVES asked whether the result of the hybridization would not be affected by the selection of the parents,—whether the male parent should be of one kind or another. The paper did not state anything on that point, but he should imagine, though he knew nothing about hybridization, that it would affect the result very materially.

Dr. PAUL said it was somewhat difficult to offer any remarks on a paper which went into such a mass of detail; but incidentally he should like to point out that the mode in which these figures had been placed before the meeting illustrated in a striking manner the disastrous consequences of the enterprise which had been pushed forward with so much unusual zeal by the Government in India. The introduction of cinchona cultivation in India seemed to have been marked by mishaps. The selection of succirubra plants under the influence of the red bark craze, which prevailed some years ago, had been perhaps the most pernicious step which had been taken. The bark of the trees of that type cultivated in India had certainly shown an improvement on the red bark brought from South America, but it was characterized by the presence of such a large proportion of the more worthless alkaloids that practically red bark was at present almost worthless as a source of quinine. The cultivation of other kinds of bark, crown especially, had resulted in a very much more favourable production of alkaloids, not only in regard to the total quantity, but in their relation to each other. The reputation of the officinalis bark, which used to be known as Loxa bark, was almost gone as an alkaloid-yielding bark; but when that tree was grown in India it produced bark yielding two, three, four, and sometimes as much as seven or eight per cent. of sulphate of quinine. However, official prejudice was in favour of the red bark, which had been largely cultivated, and wherever that was the case it had not only produced bark comparatively valueless in itself, but it had spread a degrading influence round all the neighbouring plantations, and so the hybrids referred to in the paper had been brought into existence. He could not regard the figures given as having any value beyond showing the unfortunate result which had almost brought about the ruin of the cinchona planter, the quinine manufacturer, the bark merchant, and everybody connected with the industry. Cinchonidine and cinchonine were overflowing the table in much greater quantity than was wanted, and at the same time the quantity of red bark grown had increased to such a point that it had become literally so much a drug in the market that no use could be found for it. Moreover, the comparison between the barks as shown by the table was not accurate. The crown bark as described there was what would be called by everybody acquainted with bark a very mean specimen. The proportion of alkaloids yielded by crown bark of any value was from 3 to 5 per cent. of sulphate of quinine, with something less than 1 per cent. of cinchonidine; but in the author's table there was a statement that crown bark of average composition gave half as much cinchonidine as quinine, which was altogether wrong. Passing on to the red bark the conditions were reversed, and in favour of that craze about succirubra to which he had already referred. The well known proportions in red bark were 1½ per cent. quinine with 3, 4, and 5 per cent. of cinchonidine. The representation of hybrid bark again was what he should call a purely fantastical one, for out of a table of analyses of that kind you could evolve anything you pleased to work the figures into, but such figures represented nothing which really existed in nature, and were of no kind of value. The introduction of Cartha-

gena bark was another illustration of the misguided way in which the cultivation of cinchona had been carried out. There was no reason why Carthagena bark should be cultivated to any extent in India as an article of produce. So long as it existed in South America, and a good price could be got for it, it was very well to import it and work it, but to propagate its existence was not at all desirable. The kinds of bark fit for cultivation and encouragement were the crown bark and the calisaya, but above all things the crown, as being rich in its yield, comparatively more hardy than any other, less liable to decay, and in every respect the best kind of bark to use. The feeling in favour of succirubra had extended even to the Pharmacopœia, with the result that every bark preparation that appeared there was in fact an officially adulterated article. Those preparations were made, not with such a drug as was formerly ordered, crown bark or calisaya, but with the most inferior bark that could be selected, which contained for every unit of quinine, the only really valuable constituent, 2, 3, or 4 per cent. of the comparatively valueless ones.

Mr. HODGKIN said he was glad to be able to corroborate in great measure what Dr. Paul had said. The way in which the centesimal analyses were presented was most fallacious, because for these percentages to be of any good whatever it would be necessary to assume that the percentage of the total alkaloids of the bark was the same in the various species; but everybody who knew anything about the total percentages of alkaloids in these barks must know that the percentages were not by any means equal, but that in some barks they were very much higher than in others. With regard to the crown bark analyses the figures did not represent a typical *officinalis*. If you took the analyses and examined the proportion that the quinine and cinchonidine held to one another, you could only come to the conclusion that the bark was a hybrid, and not the *C. officinalis* which the Indian Government had in their own plantations. In the Nilgiri hills they had a plantation of fine Officinalis, var. *Uritusinga*, cultivated from some plants his uncle, the late Mr. J. E. Howard, gave them some years ago, and large quantities of the bark had been sent to this market, but the analysis shown by no means represented that bark. Mr. Hooper had started with bark which was by analysis most certainly a hybrid. Then he took the mean of that analysis and that of a succirubra—which he had really no right to do, because the total percentages varied so immensely—and proceeded to build up a theoretical hybrid upon it. What the Indian Government ought to do was to take a hint from the Java Government. They had a kind of "*Calisaya-succirubra*" hybrid which Mr. Hooper alluded to in his paper, and some of the private growers in Java had had this bark on the market for some years. On testing, it gave 7 to 8 per cent. of pretty nearly pure sulphate of quinine. This bark, when examined carefully, presented the peculiar characteristics and marking both of the calisaya bark and of the succirubra. Mr. Hooper carefully left out any reference to what might be called the celebrated Indian hybrid, the "*robusta*" bark, which was produced by Col. Beddome when he was director of the woods and forests. It did not appear from the figures shown what the percentage of alkaloids was, and therefore he could make no comparison between these government hybrids and those which were on the market. The robusta bark in the Madras forests contained 4 to 4½ per cent. of sulphate of quinine, and sometimes one came across a hybrid from Ceylon, which was a calisaya hybrid, either with the officinalis or the succirubra, which came up to 6 or 8 per cent. Those were the hybrids the Indian Government ought to go in for.

Dr. THRESH, in reply to Dr. Paul said, Mr. Hooper gave in the paper in detail the analyses of the barks, and also the maxima and minima, and in two cases calculated out tables of means. He (Dr. Thresh) had simply calculated out the other two so that they might be compared; although the tables might be of no value in themselves, if they consulted the tables in which the details were given, it would be found there was a considerable fund of information to be obtained.

Dr. PAUL said he had no desire to throw any discredit on the labour Dr. Thresh had so kindly given to make the paper understood; he merely referred to the illustration which the tables afforded of the fallacies and mistakes of the Indian cinchona cultivation.

Mr. HODGKIN, in reply to Mr. Groves's question, said, to begin with, the bulk of the plants would take the form of whichever parent was the stronger plant, and not of the other one, so that in some parcels containing hybrids from the same plants originally, from calisaya and succirubra, it might be found, if the calisaya had been the stronger plant to begin with, that the resulting bark would test better than if the succirubra had been stronger.

(*To be concluded.*)

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The inaugural meeting of the fourth session of the School of Pharmacy, in connection with the Sheffield Pharmaceutical and Chemical Society, was held on Wednesday evening at the Montgomery Hall, Sheffield. The chair was taken at half-past seven o'clock by the President of the Society, Mr. E. Radley Learoyd.

Amongst those present were Dr. Symes, Messrs. Newsholme, Ellinor, Maxey, Morrison, Humphrey, Grierson, Ward, Preston, and other local pharmacists, besides many ladies.

Letters were read from Messrs. Radley and Cross and Dr. Paul, regretting their inability to be present.

Mr. Learoyd, after congratulating those present on the commencement of another session, said that it might be interesting if he gave a short *résumé* of the history of the Sheffield Pharmaceutical Society. It seemed to have been a natural outcome of the passing of the Pharmacy Act, 1868, for in January of the following year the Association was formed. Of the gentlemen who composed the first Council he regretted to say many had since gone over to the majority. There were, however, one or two present at this meeting who had been connected with the Society since its commencement.

The Society had originally thirty-two members, and the first year's income amounted to no less than £111 12*s.* 6*d.*, which after deducting necessary expenses left a balance in hand of £46 8*s.* 4½*d.*

Though much interest was shown by the members locally, yet great help was afforded by others, and the Society was considerably indebted to the wholesale houses and other friends, who not only contributed money, but sent handsome contributions in specimens for the museum and books for the library.

The first annual meeting was held in January, 1870.

From early in the Society's life, and, indeed, up to the present time, the records show that from time to time papers have been read by the members, and other efforts have been made to further the objects for which it had been originally formed.

To many gentlemen of position scientifically, the members were also much indebted for the numerous lectures, etc., of a high class which had been given; the names of Sorby, Allen, Baker, Birks, and many others might be mentioned among those who had materially helped in the work.

There had always been life in the Society, though at times it seemed somewhat fluctuating in character, and the history of the Society might be illustrated by the example of its restlessness as to habitation, for it had been singularly unfortunate in the choice of rooms for its meetings, etc. They were now, however, owing to the determined efforts of some of the members, much better placed, and he hoped that would have, as no doubt it might have, a correspondingly beneficial effect on the Association.

Throughout the whole career of the Society the question of education had not been entirely lost sight of. As long back as 1869 an effort was made to get lectures in chemistry and materia medica, but owing to some cause they gradually fell through. However, the subject had always been a source of anxiety, for the Council was clearly aware that the time would come sooner or later when such education would be compulsory.

After the passing of the Act, 1868, there was for some time in the provinces a feeling of soreness, and many chemists felt that their vested interests had been interfered with. Owing to this, and perhaps the newness of the thing, for chemists are very slow and apathetic as a rule, they did not exhibit generally such brisk alacrity to let their young men take advantage of these classes as they might have done, and so out of this state of things came a feeling from the young men themselves that something should be done, the result of which was that the first young men's association for study amongst themselves in connection with the Society was formed in 1872, and he had much pride in saying that he was made the first President.

The studies were conducted earnestly enough, but without any very settled course, though much helped by a few gentlemen, one of whom, Mr. Ellinor, he was glad to see now present. This young Society did some good work, but at last fell into decay and passed peacefully away in the year 1875.

Since 1875 there does not appear to have been much done, except spasmodically, until 1881, when another students' association was formed, but it also died away.

However, at the annual meeting in 1883, special reference was made to the subject of provincial education, and it was confidently stated that the time had come for something to be done; the only result, however, appeared in the fact that another junior society was formed in the winter of 1883–84. This seems to have done good work, for several of its members were passed satisfactorily, and it led up to the winter session of 1885, when the present Sheffield School of Pharmacy was created, and long may it flourish.

This School of Pharmacy, owing, no doubt, to the united efforts of at least two or three of its promoters, to whom great credit is due, has now attained a position which is worth recognition. From year to year since its formation the School has gone on steadily increasing both in the numbers of its students and the result of the examinations, and it was with great pleasure that he was now able to say that the School seemed fairly established as a permanent institution, the requirement for which is being shown by its great success, there being for the past session no less than forty-eight entries in the various subjects, whilst the lecturers have every reason for anticipating an equally successful session in the one now commencing.

He had now only to say that at some inconvenience to himself, Dr. Symes had very kindly come down to deliver the inaugural address; it would be hardly necessary to say more, as Dr. Symes's high position, especially as a practical pharmacist, was too well known to need any recommendation from him, but to the students he would just venture to say this :—I beg you to listen to Dr. Symes attentively. His words will be words of wisdom, what he tells you will be well worth your thoughtful consideration, bearing in mind that it is not alone to the highest flights of oratory that we are to look for knowledge, but to language, which is combined with those practical hints and suggestions which Dr. Symes is so eminently qualified to give, always remembering that though our natures may be very aspiring, yet—

"A man's best things are nearest him
Lie close about his feet,
Tho' 'tis the distant and the dim
He ever strives to greet."

He had great pleasure in introducing Dr. Symes, who delivered the following:—

Inaugural Sessional Address.

by charles symes, ph.d.

The Council of the Chemical and Pharmaceutical Association of Sheffield has done me the honour to request that I will address you on this important occasion of opening a new session and distributing the prizes to the students who competed successfully at the close of the last. I say important advisedly, for if I mistake not, you have arrived at a period when it will require all the effort you can put forth, all the support you can give, the energy of the teacher and the close attention of the student, to maintain the position you have acquired and the prestige you have won in quite a short time. I know something of the rise and fall of Pharmaceutical associations and schools, and it is, in my opinion, not the least critical period of their existence when they have aimed at a position like your own. But I look with great hope on the Sheffield school, because it was founded on the principle which must be regarded as a sound one, viz., that the students first felt the want of systematic teaching, and applied to those who had it in their power to grant their request. This having been done, the results being so satisfactory ought to stimulate all concerned to continue their efforts in the direction of progress. The syllabus just issued of your fourth session is indicative of a desire to keep pace with the times, for in addition to well arranged classes in chemistry, both theoretical and practical, physics, botany, and materia medica, a class in practical pharmacy has been added, which we formally inaugurate to-night. Truly, it is a modest beginning, but it is in good hands, and it may reasonably be hoped that so important a subject will receive such support as may soon justify its extension. Then, I observe, your fees, although slightly raised, in accordance with the suggestion made by Mr. Carteighe last year, are still low, and no student can excuse himself from joining the classes on that score. Let me in all earnestness urge the apprentices of Sheffield to embrace the opportunities thus offered early in their career. At school they will have been accustomed to the mental training by which their store of knowledge has been built up day by day, and they will find it more pleasant and more profitable to continue that process in the technicalities of the business thy have chosen than if left to a remote period.

Education has always received considerable attention at Bloomsbury Square, and we must all admit that if perfection is to be found in any school of pharmacy in Great Britain it ought to be there. Whether such is the case, it is not my present intention to argue, neither do I wish to refer more than incidentally to the other schools of the metropolis where some good teaching as well as cramming is done. But to have under the direct control of the Council in London a school where there is sound teaching and where good and useful work is done cannot but be of value to the whole craft, and must redound to the credit of pharmacy as a calling. We have, however, to wait for a further development of teaching and means of teaching practical pharmacy, and for results from the Research Laboratory before we can form a

just estimate of their value and as to how far they contribute to the greater or less perfection of the whole.

Should the Pharmacy Acts Amendment Bill, now awaiting its fate at the House of Commons, become law, and a definite course of training be required from all candidates before presenting themselves for examination, provincial schools in important centres like Sheffield will receive an impetus which nothing else that I am aware of can give them, and schools which have fallen into decay and have become more or less effete will be required to apply efficient restorative means and set their house in order if they are to survive. It will be then that the school at Bloomsbury Square will be required to serve as a model for reconstruction, and it may not be unprofitable for us to consider to what extent it will be so.

The thing which first occurs to us is the endowment, without which its efficiency would be considerably weakened, and we should have to be content with far less capable teachers. The Council of the Pharmaceutical Society has always been willing to assist provincial associations where it could be shown that there was a fair prospect of the money being well spent, and to supplement local effort wherever it has existed, by granting a lump sum, and by contributing from its museums to theirs; but up to the present time I am not aware that the question of making annual grants for educational purposes has been fully considered. Possibly the time has not yet arrived when it should be so, but sooner or later it will force itself upon us. That a ship may be built too large to be useful, profitable, or even workable, may be seen from the history and fate of the *Great Eastern*, and that a city and metropolis may grow too large to be well governed and to be of the greatest benefit to a nation is already seen by some of our eminent statesmen. Hence the tendency of the present day is toward decentralization, and if we expect results commensurate with our efforts we must work in consonance with this course. This cannot be accomplished by any one effort, but rather by a series of efforts, and although I do not wish to overestimate the value of a compulsory curriculum, it seems to me that if accomplished it cannot be other than a step forward and upward. The day cannot be far distant when large centres throughout the country will discharge much more weighty functions, and will be of greater political importance than they now are. Why should not this be so pharmaceutically? Why should not Sheffield have its school of pharmacy, the training in which should be recognized by the central metropolitan authority in such matters, and the certificate of whose teachers should satisfy the demands of the Board of Examiners, as indeed they now do of certain medical bodies? Here not only the Preliminary, but the first part of the professional examination could be conducted, and in addition to the Bell and Redwood scholarships the Council prizes could be competed for. Without Government help the annual grant to which I have referred could not be large, but it may be sufficient to assist in your work, and to call for a report from time to time as to the way in which it had been expended and of the progress made, thus keeping you in touch with the body corporate. The problem of a system on which grants can be fairly and properly made to the greatest advantage for educational purposes has yet to be solved, and merits the attention of all concerned. As far as I am conversant with the working of the South Kensington system, of payment on results, it is not a success, and leads to young men being taught to study for examinations, the passing of which is regarded as of first importance, the possession of a well-trained mind becoming secondary. Now in a school of pharmacy this should certainly not be the case; there should be periodic examinations whilst the acquirement of the knowledge proceeds, and an assessment of the results obtained. There should be an endeavour on the part of the teacher to ascertain whether the student is merely accumulating barren facts, or whether he is becoming familiar with their import and their bearing on each other. He should illustrate his teaching by experiment and specimens where practicable, hence the value of a good museum. Watts says:—

> "Sounds which address the ear are lost and die
> In one short hour; but that which strikes the eye
> Lives long upon the mind; the faithful sight
> Imbues the mem'ry with a beam of light."

The student will naturally work in the direction of the examinations he has to pass, but he should be encouraged not to keep them too much in view or to work solely for them. I am not an advocate of increasing the severity of examinations—ours are at present of sufficiently high standard for all practical purposes—but we ought to know and be satisfied that the candidate really possesses the knowledge that he appears to do, and that he can apply it practically in the conduct of his business. I quite endorse the view many times expressed by Dr. Greenhow, that the more practical our examinations are made, the better will they test the efficiency of the candidates.

But education and examination are not all; they are merely means to an end, and it is to this end I would have the student's mind more constantly directed. He should be taught to study because of the use the knowledge would be to him in the business of life, and he should be encouraged to regard that business as being worth conducting efficiently and well. Usually he is discouraged by the pessimist views of the present and gloomy forebodings of the future; he has not spent much time in pharmaceutical circles before he is inclined to put to himself the question, from a pharmaceutical point of view, "Is life worth living?" and is rarely encouraged by the answer that "it depends on him who lives it."

There always will be different views of life. Proctor the poet, sums up "the history of a life," thus:—

> "Day dawned. Within a curtained room,
> Filled to faintness with perfume,
> A lady lay, at point of doom.
>
> Day closed. A child had seen the light,
> But, for the lady fair and bright
> She rested in undreaming night.
>
> Spring rose, the lady's grave was green,
> And near it, often times was seen
> A gentle boy, with thoughtful mien.
>
> Years fled; he wore a manly face,
> And struggled, in the world's rough race,
> And won, at last, a lofty place.
>
> And then, he died. Behold before ye
> Humanity's poor sum and story,
> Life, death, and all that is of glory."

This is of course only the skeleton of a life, but with a little pleasant filling in it would be well worth living. Proctor, the pharmacist, in his 'Pharmaceutical Remuneration in relation to Pharmaceutical Progress,' sums it up differently. He gives us a much more grim skeleton with some unpleasant filling in. He depicts the horrors of the savage struggle for pharmaceutical existence; says we must either eat each other or be eaten; that in Newcastle alone in six years they had eaten twenty-one chemists, "no doubt many of them very nice men." That it is purely a question of the survival of the fittest, and not much for those who survive. That "he is a benefactor to his kind, who can make one pharmacist grow where two grew before." This memorable paper, which contains some wholesome and some unpleasant truths, was no doubt written on a very dull day under the influence of a torpid liver, but it was honestly and well meant, and the survival of its author is the best

evidence I can adduce that all nice men are not eaten up. The profession or track of pharmacy has, like all other callings, its advantages and disadvantages, and although just now we are feeling a considerable amount of pressure from all sides, I do not think this will last for all time. There is much to be done to improve our position. We must in the first place be true to ourselves; we must be united in our efforts in order to place our position more fully before the government with whom we have to deal; we must give due weight to public interest, before which everything has to give way. We must sink our minor differences for the common weal of our craft and thus be able to give a solidity to our requests which at present they do not possess. Associations like this aid considerably in bringing about this result, and should embrace the whole of the chemists and druggists of Sheffield; forming, with like associations, integral parts of one united body of chemists and druggists. This idea may appear somewhat utopian, but I feel satisfied that it is within our grasp; that if we could see our way to work in accord with the Government of our country, we may get advantageous legislation which would place us in a better position than we now are. I look forward to the time when we shall have in Bloomsbury Square a college of pharmacy, when every one who passes the examinations will become a member and fellow for life without further subscription, and will have an equal share and interest in the commonwealth of pharmacy.

This would improve our position as a class, would give everyone a vote in the election of the Council or governing body, a voice in framing the national Pharmacopœia, and would ensure, or ought to ensure, that everyone would take more interest in our educational and political affairs. On the continent the pharmacist holds a higher social position than in this country. As a student he has to go through a more rigorous course of training, to pass a higher standard of examination, and he is more restricted in his operations when he commences to carry on business on his own account. It is just a little doubtful if English pharmacists would at present care to exchange positions as a whole, but that they desire a higher standard is evinced by the fact that so many of them bring up their sons to the medical profession with that object in view. But the medical profession is becoming, or has become, as much over-crowded as our own, and in the rank and file you will hear quite as much complaining. You will be told of cheap dispensaries, where people in good position get advice and medicine at from 6*d.* to 1*s.*; of clubs where the doctor attends a whole family and provides medicine at 6*s.* or 7*s.* a year, and you will, I hope, come to the conclusion that there are difficulties in other callings as well as in our own, that it is best not to attempt to escape them by some side-wind or to out-wit by diplomacy those who are as vigilant as ourselves, not to ignore these difficulties and go grumbling on, but to face and deal with them to the utmost of our ability; that it is our duty to use every legitimate effort to raise ourselves from the morbid condition into which we have fallen; to have faith in the resources and ultimate possibilities of our calling, and to educate our young men in that faith. Let us encourage them to strive for the front ranks where still there is room, and where they may find a fair and reasonable return for their ability and labour.

At the conclusion of Dr. Symes's address, Mr. Learoyd read abstracts of the lecturers' reports.

Chemistry and Physics.

"In tendering the report of my section of last session's work, I do so with mixed feelings of pride and pleasure. The classes were well attended, as the following extracts from the attendance book will show: Ten students entered for the session, and out of a possible attendance of 26 lectures the following were made: 19, 24, 25, 13, 26, 24, 22, 25, 8, 6, making a total of 192, or an average of 19·2 per student. I would also note that the interest and attention on the part of the students showed a marked improvement on the previous session; evidence of this will be seen by a careful scrutiny of the examination results. Five papers were received by me, and the following marks are awarded: '1050,' 47; 'Bract,' 52; Humulus Lupulus, 64; Cannabis Indica, 75; Myrrh, 86; out of a possible 100. The result of the President's prize examination is not so satisfactory; evidently the reason is that in this examination the time at their disposal is not divided for each subject, which method, in my opinion, would be the fairest. The following are the marks awarded: J. H. Golland, 3; East Anglia, 4; Cannabis Indica, 6; Humulus Lupulus, 8; out of a possible 25. If again I have the honour of being elected lecturer by the incoming Council, I shall be most happy to act in that capacity to the best of my ability, and look forward to the time when my place will be filled by some one more competent and qualified to further the claims of Sheffield to become in the near future one of the great centres of pharmaceutical education.—SAMUEL T. RHODEN."

Practical Chemistry.

"I beg to report that the practical chemistry class commenced the session with twelve students, three of whom ceased attending early in the session, leaving nine. There have been twenty-five lectures, with an average attendance of nearly seven; this the good attendance, together with the conduct and attention, have afforded much pleasure to the lecturer. Five students entered the examination, the possible number of marks being 150, four of whom obtained over 100. The prize-winners are Mr. Moffat with 142, and Mr. Steer with 131 marks. These gentlemen are to be heartily congratulated on the highly efficient papers rendered. Owing to want of time, and other causes, I find I shall be unable to continue as one of the lecturers, therefore, please ask your Council to accept my resignation as such. Hoping the Sheffield School of Pharmacy may long continue successful.—C. O. MORRISON."

Botany.

"The botany class has in this, as in previous sessions, been in every way satisfactory. The number of students who joined was fifteen. One of these left the town before half the session was finished, and another only joined in the second half of the session. The average attendance taken over all was eleven. The conduct of the students leaves no cause for complaint, and the work done has been, on the whole, good. Eight students presented themselves for examination, and the marks obtained were as follows:—Mono, Herbarium, Linnæus, each 96; Axile, 35; Carota, 57; Photo, 55; Bract, 35; Gentian, 35; total available, 100. So uniformly excellent were the first three papers that I have been unable to find any difference sufficiently great to justify one being placed in front of the others. I would therefore suggest that the Council prize and the Lecturer's prize, which I had intended giving, be divided into three, one each to be awarded to Messrs. Austen, Golland, and Shaw, all of whom cannot be too highly complimented on the high excellence of their papers.—G. A. GRIERSON."

Materia Medica.

"I have to render an exceedingly favourable report in connection with the materia medica class, consisting of nine students, the average attendance has been eight. The home work done indicated close attention to the subject matter of the lectures, and in every way the class was a most exemplary one. The examination papers, both for the President's and Council prizes, were exceptionally good generally, and the prize-takers' answers in particular indicated a large amount of careful study. The first place was taken by Mr. C. D.

Moffat and the second by Mr. Golland, to whom, in consideration of his splendid home-work, I have decided to present a book as Lecturer's prize. With regard to next session I should prefer to be relieved of the lectureship, but in view of the fact that there may be some difficulty in finding anyone willing to succeed me in the post, I may decide to continue the work if the new Council wills it so.—JOHN HUMPHREY."

Dr. Symes then presented the prizes to the successful students, addressing a few words of encouragement to each:—

List of Prizemen.

Practical Chemistry.—1. Chas. D. Moffat. 2. J. H. Stear.

Theoretical Chemistry.—1. W. H. Smith. 2. H. B. Fallding.

Materia Medica.—1. Chas. D. Moffat. 2. J. H. Golland.

Botany.—J. Austen, J. H. Golland, Wm. A. Shaw, all equal.

President's Prize (all subjects).—Chas. D. Moffat.

Dr. Symes presented a copy of the 'Art of Dispensing,' to each of the prize winners.

Mr. Preston moved a vote of thanks to Dr. Symes for attending at the meeting, and presenting the prizes. His presence showed his great sympathy with the Society, and was an indication that full recognition of its work would soon follow from the Pharmaceutical Society. Already it had rendered much aid by lump-sum grants, but might do much more in this way, and also by making capitation grants, and awarding prizes upon the results of examinations. Local societies could not bear the expense of schools, and in making the effort they risked their existence. He concluded by asking their support in thanking Dr. Symes.

Mr. Ellinor spoke of his personal friendship with Dr. Symes, and expressed his gratification at his presence. He mentioned the advantages of local schools in enabling students to study at home, and begged to second the resolution.

Mr. Grierson, in supporting the resolution, spoke of Dr. Symes as a practical pharmacist of great eminence.

The thanks of the meeting were intimated by hearty applause.

Dr. Symes briefly thanked those present for their kind welcome. He doubted the chance of obtaining capitation grants, but assured them of the sympathy of all the members of Council, and approved of the policy of granting annual sums to working schools. He begged to conclude by proposing a vote of thanks to the Chairman for his services.

Mr. Ward, in seconding the motion, referred to his long acquaintance with Mr. Learoyd, and considered he was essentially the right man in the right place.

Mr. Newsholme spoke supporting the resolution.

The vote of thanks was accorded with acclamation.

After Mr. Learoyd had replied, the meeting terminated.

Parliamentary and Law Proceedings.

SELLING COTTON-SEED OIL FOR OLIVE OIL.

Mr. Alfred Fresson, chemist and druggist, Queen-street, Burslem, was on Tuesday charged before the Staffordshire Potteries Stipendiary, at the instance of Mr. E. W. H. Knight, inspector under the Food and Drugs Act, with having sold as olive oil an article that the County Analyst (Mr. Jones, Wolverhampton) declared was entirely cotton-seed oil. Mr. Knight said that the defendant sold in a bottle labelled "fine olive oil" an article which upon being analysed turned out to be an inferior vegetable oil. As he was a chemist he ought to know what he was selling, and not impose on his customers at a cost of tenpence, an article which was worth about threepence. Cases of this nature were constantly cropping up, and he therefore asked the magistrates to inflict an exemplary penalty, so as to put a stop to the practice.

The defence was that the accused purchased the oil in question from the wholesale house as a second quality of olive oil, and the price he paid for it was 3*s.* 6*d.* per gallon. Mr. Knight said 3*s.* 6*d.* per gallon was a very low price for olive oil. Tradesmen who desired to supply their customers with a pure article would give a fair and reasonable price for it. The article sold by the defendant was cotton-seed oil, which was only worth about 1*s.* 10*d.* per gallon. The accused was legally liable for the adulteration, but if he had acted innocently through being misled by the wholesale dealers, he could recover from them any penalty that might be imposed upon him. The Bench said they looked upon the case as a very serious one. Persons going to a chemist's shop especially ought to be supplied with pure articles, as their purchases were very frequently required for medicinal purposes. The defendant would have to pay a fine of £5, together with 19*s.* costs.

ADULTERATED MUSTARD.

At the Stipendiary's Police Court, at Burslem (North Staffordshire), on Tuesday, Mr. Thomas Blackshaw, chemist and druggist, Market Place, Burslem, was summoned at the instance of Mr. E. W. H. Knight, inspector under the Food and Drugs Act, for having sold mustard that was not of the nature, substance and quality demanded. Mr. F. M. Julian appeared for the defence. The evidence showed that the mustard was purchased on August 28 by the inspector's assistant, and that it was supplied to him without comment. Upon being submitted to the county analyst (Mr. Jones, Wolverhampton), it was found to be mixed with wheaten flour to the extent of 12 per cent.

It was stated for the defence that the accused did not keep mustard for sale, but as there happened to be in the shop a tin of Colman's mustard, part of which had been used in the preparation of a veterinary medicine, the defendant's assistant, as a mere matter of courtesy, supplied the inspector's assistant with 2 ounces out of it. By an oversight, he neglected to explain that it was a mixture.

The Bench did not regard the case as a very serious one, and they only imposed a fine of 5*s.*, with 21*s.* costs.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

POISON REGULATIONS.

Sir,—Permit me to express my thorough approval of the motion of which Dr. Symes has given notice, and the hope that the craft will endorse the position he has taken up. It will be nothing short of lamentable, now that the question has again been brought forward, if we fail to embrace the opportunity of showing that we have the safety of the public really at heart, and at the same time of placing ourselves *en rapport* with the Privy Council.

Hawick. THOS. MABEN.

Erratum.—Owing to an error in the draft report of the Annual Meeting of the Pharmaceutical Society of Ireland, the name of Dr. Whitla (Belfast) appeared at p. 280, instead of Mr. M. R. Whitla (Monaghan).

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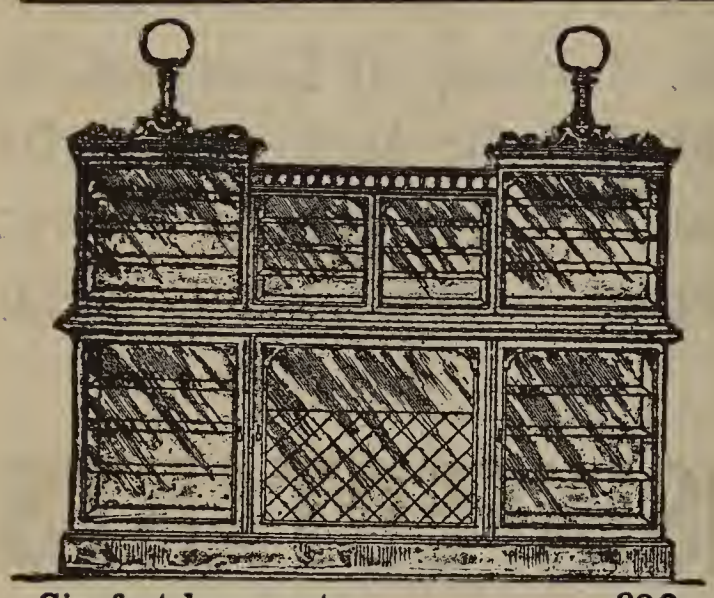

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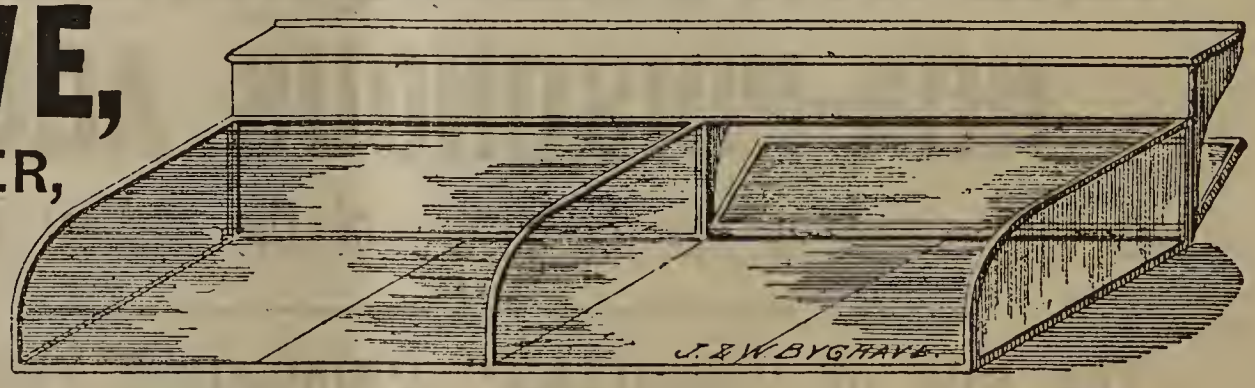

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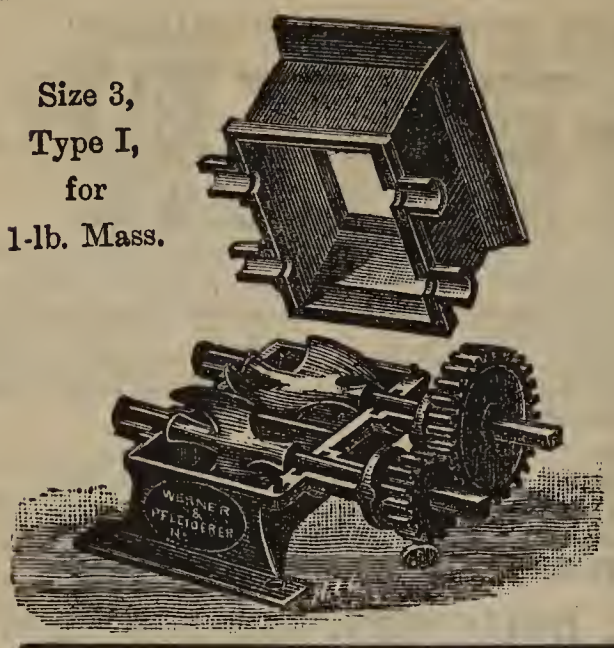

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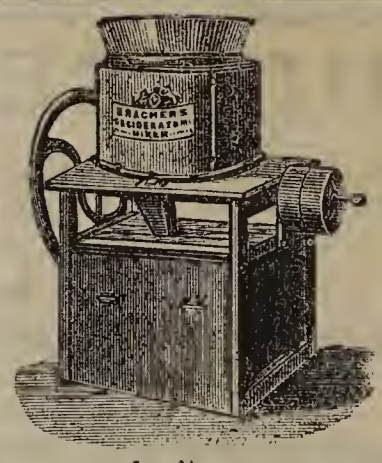

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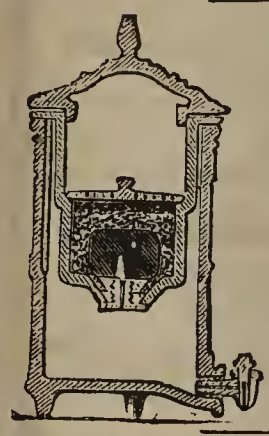

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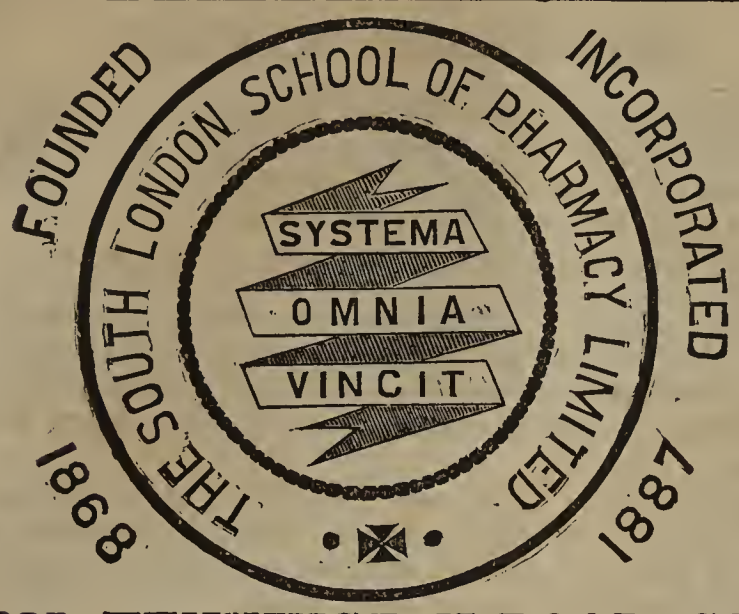

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ASSISTANT, by October 24th. Minor qualification. Single. About 22. Accustomed to Dispensing and good general business. In-doors. Personal interview preferred. H., 12, Upper Belsize Ter., near the Swiss Cottage railway station, N.W.

JUNIOR. Immediate. In-door. Age 20. State salary required, references, and full particulars. W. E. HILL, late Tomlinson & Hayward, Pharmaceutical Chemist, 233, High St., Lincoln.

AN ASSISTANT. Age about 30. Single. In door. One competent to take charge of Retail business and to Prescribe and Dispense. One desiring a permanency preferred. Apply to Mr. OWEN, 546, Harrow Rd., W. If by letter, state age, height, experience, salary required, and when disengaged.

IMMEDIATELY.—An experienced JUNIOR, of strictly steady habits, for a West End Dispensing Retail. Out-door. Time for study can be arranged if desired. Also an IMPROVER required. Address, stating salary required, experience, references, and when disengaged, PHARMACIST, 489, Oxford St., W. No Scotch need apply.

£5 bonus to person introducing an Apprentice to a first class old established Chemist. Premium required £80. Address, MARCUS, 317, Fulham Rd., London, S.W.

ASSISTANTS WANTED.

PARIS.—Assistant, about 25, qualified and speaking a little French. Board, but sleep out. Salary commencing at 130 frs. a month. Apply to Gabriel Jozeau, 49, Haymarket, London.

TO Chemists' Assistants.—Wanted immediately for Northern India a Junior or Improver. Age 18 to 20. Unexceptionable references required. Apply, by letter, to Daridge & Song, 36, Basinghall St., E.C.

PARIS.—Vacancy for an English Assistant who has passed the Minor and who wishes to learn the French language and French Pharmacy. Board and lodging free for a time, and afterwards a salary according to the value of services rendered. Apply to P. Astier, Pharmacien, 72, Avenue Kléber, Paris.

IRELAND.—Wanted, a good Assistant for front Counter and Dispensing. A good all-round man for out-door. Must be accustomed to first-class work, quick and energetic. Salary (out-door) £100. Apply, by letter, stating past experience and qualifications, to Harp, care of F. Newbery & Sons, 1, King Edward St., E.C.

JUNIOR, in-doors, about 22. One with experience of a brisk cash business preferred. Apply, stating salary, references, &c., with carte, to J. H. Lewis, 22, Great Portland St., W.

FRIENDLY Societies' Medical Association, 114, High Cross St., Leicester.—Wanted, a fully qualified Dispenser, who is capable of Dispensing for the above Association, numbering 9000 members. Salary, 32s. per week. Applications, with testimonial, stating age, to be forwarded to John Buck as above not later than Friday, October 19th, 1888.

AN Assistant, to superintend the Wholesale and Sundry department of a Country Drug business. Must be accustomed to Drug trade, and be a good Bookkeeper. State salary, out-doors, and references, to Thomas Martin, Exeter.

IMMEDIATELY, by M. M. Delacre et Cie of Brussels, an English Assistant possessing good references for character and ability. Outdoor. For particulars apply to above.

JUNIOR Assistant. A reliable Dispenser for first class retail. State full particulars and enclose carte R. W. Walden, 65, Elizabeth St., Eaton Sq., S.W.

A VACANCY for an Apprentice is open at the Aberystwyth Pharmacy, Aberystwyth. Time allowed for lectures at the University College of Wales. Preference given to those who have passed the Preliminary Examination. Apply for particulars to E. J. Evans, Pharmaceutical Chemist, Aberystwyth. Also an Improver.

FOR a West-End house, a thoroughly competent Dispenser. Must have had good experience and be well recommended. Age about 25. Liberal salary. Apply to Messrs. Meggeson & Co., 14 & 15, Miles Lane, Upper Thames St.

IMMEDIATELY, in the S.W. district of London, a young man of gentlemanly appearance and address as Assistant. Part-time for study in lieu of salary. Good experience, and comfortable home. State age, height, experience and reference. Send photo. E. F. G., care of Messrs. Barron Harveys & Co., Giltspur St., E.C.

AN Assistant, about 25, competent to manage a medium-class Retail business. Salary £50. Address, with references, when at liberty, and full particulars, to J. W., 75, Shaw St., Liverpool.

ASSISTANT. End of this month. A thoroughly good Counterman and accurate Dispenser. Must be well up in all branches of the trade. A gentleman seeking a permanency preferred. In-doors. Salary from £50 to £70 per annum. All communications not answered in 3 days refused. W. W. Broom, Chemist, Exeter.

ASSISTANTS WANTED.

AT once. A respectable youth about 16 years of age, as an Apprentice to a firm of Chemists, for a term of three or four years. A comfortable home is offered, and a small premium will be required. One having passed Prelim. preferred. Apply, B. L., Barron Squires, Bush Lane, London, E.C.

APPRENTICE. First-class opening for a well-educated, gentlemanly youth, in a good Dispensing Pharmacy. Unexceptionable opportunity for gaining thorough knowledge, assistance, and time given for study. Premium required, and references exchanged. R. F. W. Robinson, Dispensing Chemist, Seacombe.

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JUNIOR wanted. Duties light, with ample time for reading. Apply personally, 86, King's Cross Rd., London, W.C.

A QUALIFIED Assistant wanted, about 24 years of age. Will be left much in charge of business. Must be good Dispenser and have unexceptional reference. Apply to W. Warren, 28, Tulse Hill; or to C. Rundle, 24, Russell St., W.C.

APPRENTICE.—Mr. Munro, 98, Seven Sisters Rd., Holloway, N., has a vacancy for a well-educated Youth. Premium moderate. Comfortable home, and every opportunity given of gaining a thorough knowledge of a good class business.

BUSINESSES FOR DISPOSAL.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

GENUINE old-established good class Family Retail, Dispensing, and general Drug Business, in best part of a large, healthy market town in Yorkshire. In present hands 19 years. Average returns for past 5 years £1500. Profits good. Good and spacious house, warehouses, yard, and garden. Property freehold. Satisfactory reasons for disposal. Apply, in first instance, Box B 37, Leeds.

£400.—London, N.W. Important main road, corner position. Ready money, light Retail Dispensing and Prescribing. Returning £900. Rent only £50. House at present let off for £40. Shop is well-fitted and stocked. Price only £400. Satisfactory reason for selling. Should be seen at once. Chemicus, Messrs. Deacons, Leadenhall St., E.C.

A QUALIFIED Manager required, who is able to invest £200 or £300 in an old-established profitable Business in the north. Applicants to be over 30, and to have had good experience. Address, Lux, care of Messrs. Ismay & Sons, Wholesale Druggists, Newcastle-on-Tyne.

£200.—London, S.W.—Retail and Prescribing Business. Returns £290, proof. Very profitable. Could easily be improved under good management. Opening for Teeth Extracting. Medical man would do well. Trial allowed. Growing neighbourhood. Letters to W., care of Mr. Helm, 11, Buckingham St., Strand.

CHELTENHAM.—For disposal, by order of the Executors, the old-established Business of the late Mr. Woodward of the High Street, Cheltenham, either for removing or the continuation of the business. Immediate sale being desired, the vendors will be prepared to discount the value of stock and fixtures for cash. Inventory may be seen at Messrs. Orridge & Co.'s Offices, 32, Ludgate Hill, London, E.C.

BUSINESSES FOR DISPOSAL.

A PRESCRIBING Chemist's Business, in wealthy and populous suburb. Returns under £500. Full prices. Very profitable. Cash trade. Can be easily increased by energetic man, as failing health is cause of sale. Shop handsomely fitted. Long lease. Letters only. C. C., 110, Portsdown Rd., Maida Vale.

£90.—Ready-money Retail in the suburbs. Has been neglected, but now doing a fair business in Retail only. Prescriber would do £10 weekly. Same hands 15 years, last 4 under management. Rent £35. Good house. Shop is fitted in mahogany and well stocked. Rare chance for beginner. Apply, Messrs. Berdoe, 30, Jewry St., Aldgate.

LONDON, South.—For immediate disposal, an old established, middle class Practice, together with a Dispensary, returning over £400 cash, with ample scope for increasing. Price only £700. Old age and failing health cause of sale. Books, &c., can be verified. It is just the practice for a pushing young man. Very good house and garden. 2-horse stable and coach house. Apply to Mr. R. T. Waterman, Medical Transfer Agent, 11, Fairfield Rd., Croydon.

IN consequence of illness. A first-class Retail and Dispensing Business. In same hands 12 years. Situated in the main road, London, S.E. Returns £850. 8-roomed house in thorough repair. Good garden. Double-fronted shop, well stocked and fitted. Low rental. Apply to J. S., care of Sanger & Sons, 489, Oxford St., London.

SOUTH Coast, Deal.—Light Retail and Dispensing. Corner shop, handsome plate-glass front. High St. Returns £350. Full prices. Under management. Bargain to immediate purchaser. Apply, T. Casely, 175, High St., Deal, or 46, Camden Rd., London, N.W., where a photograph of the shop may be seen.

CHEMISTS and Druggists.—Lease and goodwill of Business in the heart of the City for sale. For particulars apply to J. G. Shearman, Solicitor, 38, Gresham St., E.C.

GENTLEMAN having two Businesses, one S.E., other N.W., will sell either, being too far apart to work to advantage. Both situated in marketing neighbourhood and doing very profitable trades. S.E. Business returns £450, N.W. £600. Or would exchange for a business near either, and prepared to pay cash in exchange if a larger business. Address, Chemist, 8, Parade St., Paddington.

LONDON, East.—Main road. Splendid position. Light Retail, with a good Shipping connection. Returning £700, at excellent profits. Large, well-fitted shop. Good house. Moderate rental. To effect speedy sale, the low sum of £300 will be taken. A bargain. Wholesale references given. Apply to Messrs. Berdoe, 30, Jewry St., Aldgate.

AN important business position, Surrey side of the Thames. Main road; pleasant locality. Well fitted shop, with scope for great increase and immediate income of about £200 a year. For £300 cash; small balance as agreed. K., 170, High Rd., Chiswick, W.

BUSINESSES WANTED.

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N.B.—Postage Stamps cannot be received in payment.

WANTED, a light Retail and Dispensing Business, returning about £1000. Locality not so much an object as a thoroughly bona fide business. Can pay cash for a suitable thing. Particulars in confidence to Mr. Harvey, 14, Junction Rd., Amhurst Rd., Hackney, N.E.

BUSINESSES WANTED.

RETAIL and Dispensing Business, in suburbs of London or country town. Returning £700 to £1200. Must shew a fair amount of profit. Advertiser can invest up to £1000 cash in a really genuine and reliable concern. Particulars received in strict confidence, by M. P. S., 5, South Lambeth Rd., London, S.W.

A GOOD class light Retail and Dispensing Business required, yielding a net profit not less than £300 per annum, with scope for increase. Comfortable house. Sea-side preferred. No agents. Full particulars to Ætas, care of Messrs. Maw, Son & Thompson, Aldersgate St., E.C.

FIRST-CLASS Retail and Dispensing Business required. One that is returning over £1000 and that will bear the strictest investigation, in good town. The midlands, south, or south-west of England preferred. Particulars to Chemist, care of Messrs. Maw, Son & Thompson, Aldersgate St., London, E.C.

MR. G. B. CROCKER,

Valuer, Transfer Agent & Accountant,

15, WALBROOK, E.C.

Cheshire.—Retail and Dispensing Business. Returns £1300. Price £700. Large, double-fronted shop; good house and garden.

Midlands.—Dispensing and Prescribing Business. Returns £700. Good profits. Price £400.

Surrey.—High class Dispensing Trade. Well situate in a busy town within one hour's ride of London. Returns £1200. Price £1000.

London, S.E.—Retail and Dispensing. Returns £900. Price £550. Must be sold, through death.

London, W.—Retail and Dispensing Business, chiefly cash. Returns £650. Net profit £300. Price £550.

London, S.E.—Good class Family Trade. Returns £1000. Price £850.

Valuations for Probate or Transfer conducted in any part of the United Kingdom. Terms on application.

Messrs. BERDOE & CO.

Transfer Agents and Trade Valuers,

30, JEWRY STREET, ALDGATE, CITY.

Established 1870.

Cornwall.—High class Dispensing Business. Full prices. Good position. Returns £1200. Price £1000.

Berks.—Good class Dispensing, with little Dentistry. Returns £1800. Net profit £700. Price £1500.

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Warwickshire.—Death vacancy; same hands 30 years. Returns £500 under management. Price £300.

London, W.—Elegantly fitted Retail. Returns £600. Good house. Low rental. Price £550.

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S.W.—Increasing suburb. Returns £5 week; can be doubled. Rent £35. Only £100.

Others from £100 to £4000 free on application.

TO BE LET.

OXFORD STREET, W.—To be Let. Splendid corner premises, particularly suitable for the business of a Chemist and Druggist. Apply to Messrs. Marler & Bennett, 175, Sloane Street, S.W.

F. J. BRETT,
VALUER, LEICESTER,
60, ST. STEPHEN'S ROAD.

VALUATIONS.—It is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.
Probate and Fire Insurance valuations.

BANKRUPTS' STOCKS BOUGHT.

MIDLANDS.—Death vacancy. Returns about £800. Light Retail, PRESCRIBING, &c. Changed hands once in 60 years. Death vacancy. Price £400.

YORKS.—Returns £500. Pleasant town. Rent £30. Retail, PRESCRIBING, &c. Valuation about £200.

KENT.—Good class Retail, DISPENSING, &c. Returns £800. Good position. Private entrance. Price £700.

BIRMINGHAM.—Light Retail, PRESCRIBING, &c. Excellent opening for good practical Dentist. Returns £500. Rent £38. Price about £300.

SURREY.—Country RETAIL. Full prices. Fair Dispensing. Returns £500. Price about £400.

DURHAM COUNTY.—Returns £1600. Good RETAIL, with Wines and Spirits. Price about £1000.

DURHAM. — General RETAIL. Good Prescribing and excellent Proprietaries. Returns £900. Valuation about £500.

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Vendors of good class Concerns can be at once supplied with Partners or Buyers, as F. J. Brett has buyers prepared to invest from £1500 to £3000.

Transfers, Valuations and Auctions conducted throughout the United Kingdom by Mr. BRETT, Leicester.

PARSON C. BAKER,
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1. STAFFORDSHIRE.	Returns	£1000.	Rent	£40.	Price	£300
2. KENT	„	900.	„	90.	„	650
3. ROTHERHITHE	„	385.	„	48.	„	250
4. ISLE OF MAN...	„	500.	„	50.	„	350
5. KENT	„	660.	„	52.	„	400
6. SUNDERLAND ...	„	500.	„	50.	„	400
7. KENT	„	1000.	„	45.	„	750
8. BIRMINGHAM ...	„	500.	„	38.	„	300
9. BIRKENHEAD ...	„	750.	„	60.	„	250
10. STAFFORDSHIRE	„	1200.	„	60.	„	1150
11. LIVERPOOL ...	„	900.	„	50.	„	600
12. DURHAM ...	„	1600.	„	65.	„	1000
13. CHESHIRE ...	„	1300.	„	55.	„	700
14. NOTTINGHAM ...	„	400.	„	25.	„	200

Some of above, newly established, increasing rapidly.

Chemists issuing Almanacks
SHOULD
send Specimen Copy and price for Advertisements
TO
E. S. BALCHIN, 6, Royal Terrace, Margate.

LAST TRADE NOTICE. Pharmaceutical Products.
RA-THUTI. AGENTS SOUGHT.

SPECIAL FEATURES.—Labels forbid underselling. The accompanying Pamphlets are scientific *brochûres*. Profit 40 per cent. Specimens free for stamped address.

RA-THUTI, Dulwich, London, S.E.

The Pharmaceutical Journal
HAS A
Guaranteed Circulation of 7000 Copies Weekly

CHEMISTS' TRANSFERS.
32, LUDGATE HILL, LONDON.

MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

VENDORS have the advantage of obtaining an opinion on Value, derived from extensive experience, and are in most cases enabled to avoid an infinity of trouble by making a selection from a list of applicants for purchase, with the view of submitting confidential particulars to those alone who are most likely to possess business qualifications and adequate means for investment

PURCHASERS who desire early information regarding eligible opportunities for entering business will greatly facilitate their object by describing clearly the class of connection they wish to obtain.

N.B.—No Charge to Purchasers.

Messrs. ORRIDGE & CO. are instructed to transfer :—

1. LONDON SUBURB, N.W.—Dispensing and Prescribing BUSINESS of good class ; established many years. Returns £700 yearly, at very good prices. Well fitted double-fronted shop and good stock. Rent £50. Good house and garden. Price about £700.
2. LONDON.—(Wholesale Partnership.) A PARTNER required in a very old-established well-known business. A gentleman prepared to undertake travelling required. About £2000 required at present.
3. LONDON SUBURB, S.E.—Good class BUSINESS, situate in main road. Well fitted double-fronted shop, with good stock. Returns about £850 yearly. Comfortable house, with garden. Rent low. Held on lease. Price about £800.
4. DORSET.—Very old-established Retail and Dispensing BUSINESS. Held by the vendor over 20 years. Returns £555, average. Well fitted shop and good stock. Price about £400.
5. EASTERN COUNTIES.—Good market town. First-class Retail and DISPENSING. Returning at present at the rate of £1500 yearly. Net profits above the average. Handsomely fitted shop and fairly stocked, &c. Good house ; attractive garden ; greenhouses, &c. Small premium and valuation.
6. HOME COUNTY.—Within easy distance of London. Mixed TRADE. Returns nearly £2200. Chiefly ready-money. Good opening for extending into agricultural trade. Net profits above the average. Small premium and valuation. Half the purchase-money may be paid by instalments.
7. SUFFOLK.—In a large town, a very good class Retail BUSINESS. Entirely managed by an Assistant. Returns at present at the rate of £600 yearly. Comfortable house, with garden. Small premium and valuation.

Personal applicants receive Messrs. O. & Co.'s direct attention and advice, where required, free.

VALUATIONS.

Terms for valuation on application.

Appointments by post or wire have immediate attention.

ORRIDGE & CO.
32, Ludgate Hill, E.C.

1888. TWENTY-SECOND SEASON.

REGISTERED LUNG PROTECTOR TRADE MARK

THE

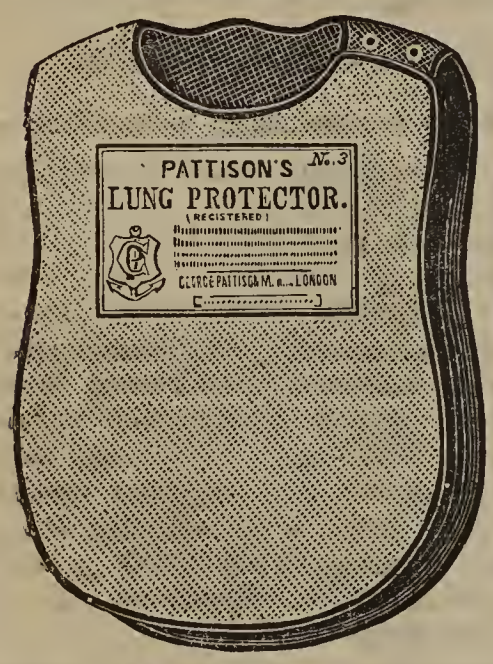
LUNG PROTECTOR

(REGISTERED).

"AN ARTICLE OF ACKNOWLEDGED EXCELLENCE."

The "LUNG PROTECTOR" continues to be made only from the same Fine Soft Wool which has always been used since its introduction, 22 years ago.

Chemists are respectfully cautioned against imitations made from lower quality Wool, although sold as "Best Felt."



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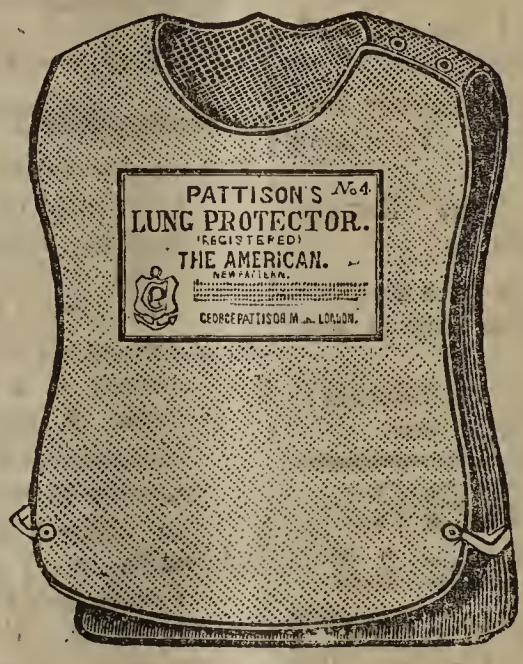

Lung Protector.
THE AMERICAN

Lung Protector.
THE CANADIAN.

PRICES:

	No. 0.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	
ORIGINAL PATTERN, Eight sizes ...	14/-	18/-	26/-	34/-	42/-	52/-	60/-	70/-	per doz.
THE AMERICAN, Seven sizes ...	...	20/-	28/-	36/-	44/-	54/-	62/-	72/-	„
THE CANADIAN, Seven sizes ...	...	22/-	30/-	40/-	50/-	60/-	70/-	80/-	„

FELT CHEST PROTECTORS.

	No. 00.	No. 0.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	
Nine sizes	4/-	6/-	8/-	10/-	12/-	16/-	20/-	24/-	28/-	per doz.

All in Scarlet and White, and made in same Wool as the "Lung Protector."

FELT CHEST PROTECTORS, C. QUALITY. { Single .. No. 1, 7/-; 2, 9/-; 3, 11/-; 4, 14/-; 5, 18/- per dozen.
Double .. No. 1, 16/-; 2, 22/-; 3, 28/-; 4, 34/-; 5, 44/- „

These are warranted equal to BEST of other makers, but are NOT recommended.

Terms: All Wholesale Houses either allow a large Discount for Cash, or quote the goods at Reduced Net Cash prices.

GEORGE PATTISON,

Inventor and Manufacturer,

139, ST. JOHN STREET ROAD, LONDON, E.C.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 956.] SATURDAY, OCTOBER 20, 1888. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, November 14th, at half-past Seven.

The chair will be taken at Eight *precisely*.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, November 7th, as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society, of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of THREE ANNUITANTS on the Benevolent Fund of this Society will take place on Thursday, the 6th day of December next, at 12 o'clock precisely.

RICHARD BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 3rd, 1888.

For List of Approved Candidates, see next page.

There are at present *forty-nine* annuitants, receiving £1670 per annum, and casual relief is also granted, amounting in 1887 to nearly £500. The total expenditure in 1887 was £2375.

The following is the scale of pensions :—

£30 per annum to pensioners under 65 years of age, and £35 per annum to pensioners 65 years of age, and upwards.

ABSTRACT OF RULES IN REFERENCE TO VOTES AT THE ELECTIONS OF ANNUITANTS.

Annual Subscribers of
Half-a-crown are entitled at each election of Annuitants to .. .. ONE Vote.
Five Shillings .. .. TWO Votes
Half-a-guinea .. .. FIVE Votes
One Guinea .. .. TEN Votes.
And to increase in the same proportion.
Five Guineas are entitled to .. .. FIVE Votes for life.
Ten Guineas .. .. TEN Votes for life.
And to increase in the same proportion.

Should any Subscriber or Donor, or the widow of any Subscriber or Donor, become a Candidate for an annuity, such number of votes shall be placed to his or her credit, at the first succeeding election, as shall be represented by the whole amount of subscriptions or donations to the Benevolent Fund he or she (or in the case of a widow, her husband) may have contributed.

Donations and Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to RICHARD BREMRIDGE.

BENEVOLENT FUND.

APPROVED CANDIDATES.

BROWN, ELIZA. Louth. Age 58. Widow of a member from 1853 to 1885, and subscriber to the Fund. Applicant is entirely dependent on the temporary charity of friends, and is in bad health. Her own son is unable to assist her, and two step-children do not contribute towards her support.

CHAPMAN, RICHARD J. Aberystwith. Age 75. A member from 1849 to 1888, and a subscriber to the Fund from 1871 to 1885. Applicant was in business at Ongar thirty-five years, and subsequently went to Smethwick, where he was unsuccessful. He has hitherto had an allowance from his son, but the latter is unable to continue the assistance. Two other children do not contribute to applicant's support, and he is unable on account of his age and infirmities to earn anything.

EDWARDS, HANNAH C. 89, Church Street, Stoke Newington. Age 60. Widow of a registered Chemist and Druggist in business before August 1st, 1868. Applicant suffers from valvular disease of the heart, which renders her quite incapable of following any employment or doing regular work. Most of the friends who formerly assisted her are now dead, and she is dependent on a friend with whom she is staying at present.

JONES, AUGUSTA. Age 60. Marlborough. Widow of a registered Chemist and Druggist in business before August 1st, 1868. Husband was in business twenty-four years at Cowes and Marlborough, and died in 1878. Applicant continued to carry on the business until 1884, but was unsuccessful. The interest on £100 invested in gas shares is all she now has to depend upon, as she has no relatives able to help her, and her health is very feeble. [*Second application.*

MUMBRAY, HENRY G. Crumpsall, Manchester. Age 67. A member from 1870 to 1887, and subscriber to the Benevolent Fund from 1867 to 1884. Applicant has been in business in and near Manchester twenty-seven years, but was obliged to sell out in 1886 to satisfy his creditors. His only support is the small sum he can earn by occasional employment as locum tenens, and this, owing to his age and infirmities, must shortly cease. There is no one to assist him except an adopted daughter, earning £50 a year, who does what she can. Applicant's wife is in chronic ill-health.

SPENDELOW, MARY E. Liverpool. Age 58. Widow of a registered Chemist and Druggist in business before August 1st, 1868. Husband was unsuccessful at the Elections of Annuitants in 1885 and 1886, and died in January, 1887, leaving his widow entirely without means. Applicant suffers from lung disease.

[*Second application.*

STEVENS, ELIZABETH J. Lichfield. Age 77. Widow of a member from 1853 to 1881, and subscriber to the Benevolent Fund from 1867 to 1881. At the time of her husband's death in 1881 applicant had £100 of her own, and the sale of the business produced an additional £146. She has since lived on this money (£246), and is now without means of support. She is totally unfit, by reason of her great age and ill-health, to help herself, and she has no friends able to assist her.

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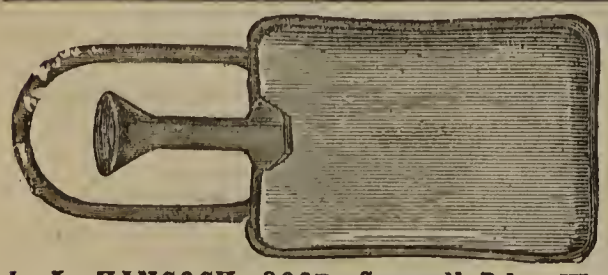

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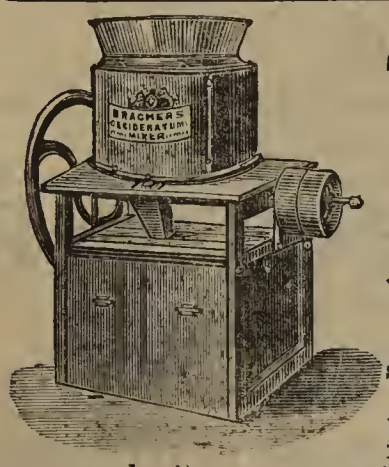

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Fig. 3.
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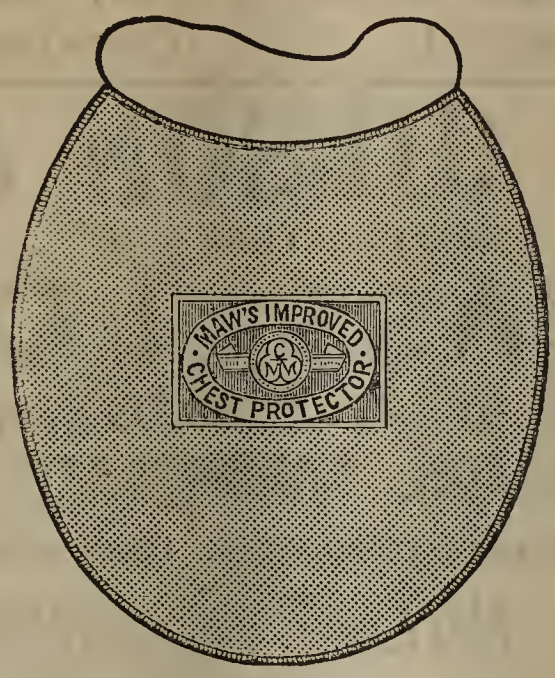

Fig. 4.
Single, Chest Protector.

Fig. 5.
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Fig. 3. Double	per doz.	20/	26/	32/	39/
Ditto, perforated	,,	24/	32/	38/	46/
Fig. 4. Single	,,	9/	11/6	13/6	16/
Ditto, perforated	,,	11/	14/	16/	19/
Fig. 5. Vests ,,	,,	27/	34/	42/	51/

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		No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
Fig. 3. Double, best,	per doz.	17/	22/	27/	33/	44/
Ditto, second	,,	14/6	19/	23/	28/	37/
Fig. 4. Single, best	,,	7/6	9/6	11/	14/	20/
Ditto, second	,,	6/6	8/	9/6	12/	16/
Fig. 5. Vests, Scarlet	,,	17/	22/	27/	33/	40/

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	Bots.	½ Bots	Bottles.		½ Bottles	
Æsculap	15/	12/	25	28/	50	48/
Alet	10/	..	50	38/	..	..
Apollinaris	6/3	5/	50	25/	100	39/
Birmensdorf	12/	..	50	48/	..	..
Bonnes	12/	10/	50	48/	50	40/
Bourboule (La)	11/	..	50	42/	..	..
Bussang	7/	..	50	28/	..	..
Carlsbad	10/	..	50	40/	..	..
Condal	..	14/	..	..	50	56/
Contrexeville "Le Cler"	8/	..	50	32/	..	..
Do. "Pavilion"	9/	..	50	35/	..	..
Ems	7/	..	50	28/	..	..
Flitwick	12/	..	..	..	..	..
Friedrichshall	13/	10/	25	25/	50	40/
Glesshubler, double-size bottles	11/	..	25	21/	..	..
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Homburg	10/	..	50	38/	..	..
Hunyadi-Janos	15/	13/	25	30/	50	50/
Johannis-Brunnen	6/	5/	50	23/	100	36/
Kissengen	11/	..	50	45/	..	..
Kreuznach	11/	..	50	45/	..	..
Kronenquelle	10/	..	50	40/	..	..
Marienbad	10/	..	50	38/	..	..

NAME.	Per Dozen.		Original Packages			
	Bots.	½ Bots	Bottles.		½ Bottles	
Missisquoi	18/	..	24	35/	..	..
Mont Dore	10/	..	50	40/	..	..
Oberbrunnen	10/	..	50	40/	..	..
Orezza	12/	..	30	28/	..	..
Pullna	12/	8/	40	36/	40	25/
Roisdorf	6/	..	50	25/	..	..
Rosbach	6/	5/	50	24/	100	36/
Royat	9/	..	50	34/	..	..
Rubinat	15/	..	25	30/	..	..
St. Boës	12/	..	50	48/	..	..
St. Galmier Badoit (Still)	6/	..	50	22/	..	..
Do. Noël (Sparkling)	6/	4/	60	26/	100	34/
St. Moritz	12/	..	50	48/	..	..
Salvator	..	9/	..	..	50	36/
Schwalbach	8/	6/	50	30/	50	24/
Selters	6/	4/	50	23/	50	16/
Sulis	6/	5/	50	23/	100	36/
Tarasp	12/	..	30	28/	..	..
Taunus	5/6	4/6	50	22/	100	32/
Vals (Société Springs)	8/6	..	50	32/	..	..
Vichy (State Springs)	8/6	7/6	50	32/	50	28/
Victoria Ofner	14/	10/	25	27/	50	38/
Wildungen	10/	..	50	40/	..	..

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Strongly recommended by the Medical Profession. Innumerable Testimonials.

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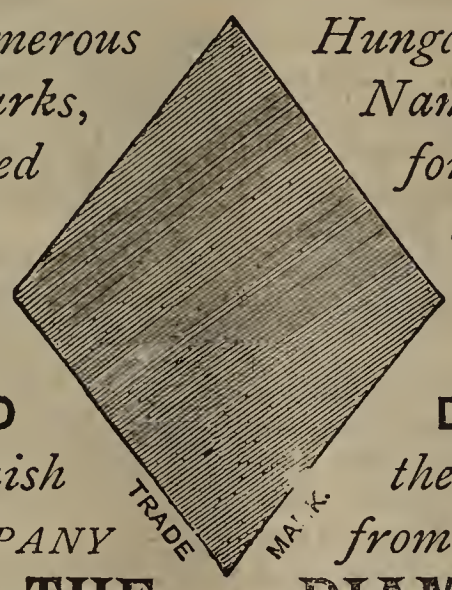

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Spiritus Ætheris Nitrosi

Guaranteed to contain the proportion of Nitrous Ether directed by the British Pharmacopœia.

Æther Nitrosus and Sol. Ætheris Nitrosi

Respectively 8 and 4 times the strength of the Spirit.

Spirit. Ammoniæ Aromaticus

Made from Volcanic Ammonia.

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"TABLOIDS" of Compressed Drugs.

PREPARED BY BURROUGHS, WELLCOME & CO.

The "Tabloids" furnish all the advantages of pills, and none of their disadvantages. They are portable, easily carried in the waistcoat pocket, and can be taken while following the daily avocations. A most noteworthy feature about them is that accidents are not apt to happen, for the dose of each is accurately appointed.

The Tabloids present many and very substantial advantages over all other forms of medicines yet introduced. First of all they are made with the pure drug only, and are not contaminated with needless and objectionable excipients. They do not therefore, like pills, change their condition and become insoluble with time; nor do they, on the other hand, crumble like the imitations do, care being taken to compress them with sufficient force to prevent their falling to pieces.

The "Tabloids" are compressed "hard and soft," due regard being paid to the purpose for which they are to be used. Those designed for dissolving in the mouth, like Chlorate of Potash, Chlorate of Potash and Borax, and Voice Tabloids, are made very hard; while those destined for internal administration are less dense, and quickly disintegrate, such as Bismuth Subnitrate, Manganese Dioxide, Charcoal Tabloids, etc. Others of the more lightly compressed Tabloids dissolve with the greatest readiness: for example, the soluble Quinine Tabloids dissolve almost as quickly as they touch the water. The Sodium Bicarbonate "Tabloids" are as pure and active as this salt can be, a sufficient dose of it not failing to relieve a "Sour-Stomach." The Potassium Bicarbonate "Tabloids" are likewise an eligible preparation, pure and reliable—this salt, as is well known, enjoying precedence over Sodium Bicarbonate in those cases where the "acidity of the stomach" is ever recurring and chronic. This is the salt par excellence in the indigestion from fatty acids, to alkalize the urine, and eradicate the causes of "chronic acidity."

Dr. J. A. Marston, Deputy Surgeon-General, in his official report on the recent International Medical Congress, held at Washington, says :—

"These Tabloids are not more expensive than the ordinary forms of administering medicines, as they can be made at a very small advance on the crude drug.

"They keep well in all climates, and are unaffected by heat or moisture. Specimens were examined which had been round the world in SS. 'Ceylon.' Mr. H. M. Stanley, in his work, 'The Congo,' vol. ii., pages 325 and 327, refers to their value."

LIST OF "TABLOIDS."

Ammon. Bromide, 5 and 10 gr.
Ammon. Chloride, 3, 5 and 10 gr.
Ammon. Chloride with Borax.
Antifebrin, 2 gr.
Antipyrin, 5 gr.
Bismuth Sub-nit., 5 and 10 gr.
Caffein Citrate, 1 gr.
Cascara Sagrada Ext., 2 gr.
Cathartic Comp. U. S. P.
Charcoal, 5 gr.
Chloral Hydrate, 5 gr.
Chloramine.
Cinchonidia Salicylate, 2 gr.
Cocaine, Potash and Borax (Voice.
Ipecac. and Opium (Dover Powd.), 5 gr.
Ipecac. Powder, 5 gr.
Iron and Quinine Cit., 3 gr.
Laxative Vegetable.
Lithia Carbonate, 2 gr.
Manganese Dioxide, 2 gr.
Nitro-Glycerine.
Pepsin, Pure (Fairchild).
Pepsin Saccharated, 5 gr.
Peptonic.
Potash Bicarb., 5 gr.
Potash Chlorate, 5 gr.
Potash Chlorate with Borax, 5 gr.
Potash Nit. (*Sal Prunella*), 5 gr.
Potash Permanganate, 1 and 2 gr.
Potassium Bromide, 5 and 10 gr.
Potassium Iodide, 5 gr.
Quinine, ½, 1, 2, 3 and 5 gr.
{ Quinine Sulph., 1 gr.
{ Ferri Redact., 1 gr.
{ Arsenic, 1/20 gr.
{ Strychnia, 1/30 gr.
{ Quinine Sulph., 1 gr.
{ Arsenic, 1/20 gr.
{ Strychnine, 1/30 gr.
Rhei Comp., 3 gr.
Rhei and Magnesia, 5 gr.
Rhei and Soda, 5 gr.
Rhubarb, 3 gr.
Saccharin, ½ gr.
Salol, 5 gr.
Soda Bicarbonate, 5 gr.
Soda Chlorate, 5 gr.
Soda Chlorate and Borax, 5 gr.
Soda-Mint.
Soda Salicylate, 3 and 5 gr.
Soda Sulpho-carbolate, 5 gr.
Sodium Bromide, 5 and 10 gr.
Sodium Iodide, 5 gr.
Strophanthus, 2 minims of Tinct. in each.
Sulphonal, 5 gr.
Tannin.
Test Tabloids.
Tonic Comp: { Fer. Pyrophos., 2 gr. / Quinine, 1 gr. / Strychnine 1/100 gr.
Trinitrine (*Nitro-glycerine*), 1/100 and 1/50.
Trinitrine and Amyl Nitrite
Trinitrine Comp: { Trinitrine 1/100 gr. / Nitrite of Amyl, ¼ gr / Capsicum, 1/50 gr. / Menthol, 1/50 gr.
Urethane, 5 gr.
Voice (Potash, Borax and Cocaine).
Zinc Sulph., 1 gr.
Zinc Sulpho-carbolate 2 gr.
Zymine Tabloids.
Zymine Comp. Tabloids

TABLOIDS of Triturated Drugs.

The Tabloid Triturates are made by compressing a small, uniform and appreciable dose of medicine, triturated with sugar of milk, into lenticular form. Brunton has pointed out that this method of giving medicine has "the very great advantage that the desired effect can be produced with greater certainty and with less risk of an overdose being taken." The Tabloids of Triturated Drugs are easier to swallow than pills, and as the sugar of milk will dissolve as soon as it enters the stomach, they are certain to be disintegrated at once. They are pleasant to take.

LIST OF "TABLOIDS."

OF TRITURATED DRUGS.

¶ Price to the trade 8/6 per doz. bottles of 100 of the following Tabloid Triturates.

Aconite Tinct. .. .. 1 min.
Antimonti et Potass. Tart. 1/100 gr.
Arsenious Acid 1/100 and 1/50 gr.
Belladonna Tinct. .. .. 1 min.
Calcium Sulphide .. .. 1/10 gr.
Capsicum Tinct. .. .. 1 min.
Digitalis Tinct. .. .. 1 min.
Hydrarg. Perchlor. .. .. 1/100 gr.
Hydrarg: Cum Cretæ (Grey Powder) 1/3 gr.
Hydrarg. Subchlor. (Calomel) 1/10 gr.
Hyoscyamus Tinct. .. .. 1 min.
Tinct. Camph. Co. (Paregoric) 2 min.
Nux Vomica Tinct. .. .. 1 min.
Quinine .. .. 1/10 gr.

Price to the trade 8/6 per doz. bottles of 50 of the following Tabloid Triturates.

Aloin .. .. 1/10 gr.
Anti-Constipation { Aloin 1-5 gr. Strych. 1-60 gr: / Belladon. Ex. 1-8 gr. Ipecac. 1-16 gr
Apomorphine Mur. .. .. 1/50 gr.
Atropin Sulph. .. .. 1/100 gr.
Digitalin .. .. .. 1/100 gr.
Dover Powder .. .. 1/2 gr.
Euonymin Resin .. .. 1/8 gr.
Hydrarg. Iod. Rub. .. .. 1/20 gr.
Hydrarg Iod. Vir. .. .. 1/8 gr.
Morphine Sulph. .. 1/20 and 1/8 gr.
Piperine .. .. .. 1/20 gr.
Opium Tinct. (Laudanum) 2 min.
Pilocarpin Mur. .. .. 1/20 gr.
Podophyllin Resin .. .. 1/4 gr.
Santonin .. .. .. 1/2 gr.
Strophanthus Tinct. .. 2 min.

Above prices subject to usual discount.

EMBELIA RIBES.

SECOND NOTICE.

BY C. J. H. WARDEN.

In a former communication to this Journal (January 21, 1881, p. 601) the results of a partial examination of *Embelia ribes* were described. The most interesting principle isolated was an acid—embelic acid; in this note the ultimate composition of the acid is given, together with certain of its reactions.

The embelic acid used for ultimate analysis was repeatedly crystallized from absolute alcohol, and the soft crystalline mass thus obtained strongly pressed between layers of cloth to remove mother-liquor. The resulting cake was freed from alcohol by exposure to air, reduced to powder, and finally dried at 100° C. in the water oven for some hours.

On combustion with cupric oxide in a current of oxygen in an open tube, the following results were obtained:—

A.—·2696 gram acid gave ·6920 gram CO_2 and ·2308 gram H_2O.

A.—·2534 „ „ ·6506 „ „ ·2106 gram H_2O.

From these figures the following percentage composition is deduced:—

	Carbon.	Hydrogen.	Oxygen.
A	70·000	9·495	20·405
B	70·019	9·234	20·747
Mean . . .	70·009	9·364	20·627

These percentages lead to the formula $C_9H_{14}O_2$, as is seen by the following comparison:—

		Theory.		Found.
9 equiv. of	carbon .	108	70·129	70·009
14 „	hydrogen .	14	9·090	9·364
2 „	oxygen .	32	20·781	20·627
		154	100·000	100·000

In order to determine the molecular formula, compounds of silver and lead with embelic acid were examined. In preparing the metallic salts of embelic acid, as the acid is insoluble in water, alcoholic solutions neutralized with ammonia—any excess of ammonia being driven off by prolonged boiling—were mixed with hot alcoholic solutions of silver and lead. The resulting precipitates were allowed to subside, washed with water by decantation, thrown on a filter and washed with alcohol, then with ether, thirdly with water, and finally again with alcohol and ether. The precipitates were very difficult to wash, owing to caking, and during the operation a certain amount of decomposition appeared to occur. Thus, in preparing the lead and silver salts, after mixing the solution of embelic acid with an excess of the metallic solution, the supernatant liquid, when the precipitate had subsided, was colourless; but on washing the precipitate with alcohol and ether, the filtrate was coloured yellow, and after prolonged washing with water the filtrates afforded evidence of the presence of silver or lead, and then when alcohol and ether were used for the final rinsings the filtrates were again coloured yellow.

Ignition of the silver salt, after having been dried at 100° C., indicated that it contained 40·653 per cent. of the metal, which gives 264·9 as the molecular weight of the salt, and 158 as the molecular weight of the acid, the acid being represented by the formula $HC_9H_{13}O_2$. The silver salt would have the formula $AgC_9H_{13}O_2$, which requires the following theoretical percentage:—

Carbon	41·432
Hydrogen	4·987
Silver	41·302
Oxygen	12·279

The composition of the salt as determined by analysis afforded the following percentages:—

Carbon	41·544
Hydrogen	5·557
Silver	40·653
Oxygen	12·246

Two analyses of the lead salt afforded 37·781 and 37·810 per cent. of lead respectively, which gives a mean percentage of 37·795 as the lead content of the salt. Taking the lead salt to be represented by the formula $(C_9H_{13}O_2)_2Pb''$, its theoretical percentage composition would be:—

Carbon	42·154
Hydrogen	5·074
Lead	40·282
Oxygen	12·490

while the actual percentage as determined by analysis gave the following figures:—

Carbon	43·545
Hydrogen	5·824
Lead	37·795
Oxygen	12·836

A comparison of the theoretical and found percentages for the silver and lead salts, indicates differences which can only be accounted for by assuming that the salts were partially decomposed during preparation.

Embelic acid was found to have a melting point of 139·5° C. to 140° C. (uncorrected), when it forms a deep ruby liquid. At about 155° C. it commences to decompose; indications of a portion having sublimed were noted.

The following colour reactions were obtained by adding the respective reagents to dilute alcoholic solutions of the acid.

Ferric chloride a dirty brownish-red colour.

Ferrous sulphate brownish colour.

Chloride of zinc violet colour.

Phosphomolybdic acid light green precipitate.

Plumbic acetate dirty green precipitate.

Nitrate of silver dirty reddish-brown precipitate.

Embelic acid is insoluble in water, and is not decomposed by being boiled with dilute sulphuric or hydrochloric acid. Salts of embelic acid with soda, potash and ammonia were prepared. The ammonia salt was the one most readily obtained crystalline. When an alcoholic solution of embelic acid was mixed with strong ammonia in excess, and the deep red resulting liquid allowed to evaporate spontaneously, the salt crystallized in large needle-shaped crystals of a foxy red hue.

The ammonium salt was found to be effective as an anthelmintic for tænia in doses of 3 grains for children and 6 grains or more for adults. It would appear to act in cases in which the ordinary tæniacides fail. The best method of administration is to give the salt with a little honey or simple syrup, the drug being preceded and followed by castor oil. The ammonium salt of embelic acid possesses one very important advantage over the liquid extract of male fern—it is tasteless—and may thus prove a useful addition to our materia medica.

Medical College, Calcutta.

KAURI GUM INDUSTRY.

BY RALPH ROBINSON.

A reader and occasional correspondent of the *Pharmaceutical Journal* for upwards of a third of a century is likely to miss something as the weeks come round, and there is no "journal" to show what progress pharmacy at home is making, and no report of the Council meeting to criticize and approve or condemn. There is a feeling that one ought, if possible, write something for its pages, if only just to keep oneself within touch of old friends, and if not instructive it may be interesting to learn something of the Kauri gum industry, which gives employment to many people around Auckland and of the ways of locomotion and enjoyment in a young undeveloped country. Perhaps the account of an excursion to the gum fields through the native bush may interest some of your readers.

It was a fine summer morning in March when our little party of two ladies and one gentleman set off on a trip to the west coast of the North Island. There being no railway or other conveyance to Karè Karè we had to do what others do under similar circumstances, namely, walk or ride (we preferred the former) the greatest portion of the way, carrying with us some provisions, tin cans for boiling and cooking, tin pannikins and plates, a few other articles and as few clothes as possible, the whole fastened up lightly in rugs or blankets and slung on the shoulders knapsack fashion. Having gone as far as we could by rail we alighted, and after adjusting our swags, as this kind of luggage is usually called, we commenced our journey over the lofty ranges separating the east coast from the west. The first two miles was through cleared and partly cultivated lands, apples and other fruits growing to great perfection on this clayey soil. Then a mile or so of ti-tree scrub, *Leptospermum scoparium* (Captain Cook's tea tree), bearing a large quantity of rosaceous white blossoms, even when only a few inches high. It grows quickly and attains a height of twenty feet or more, and is principally used as fuel. Here and there may be seen a settler's wooden house, comfortable enough in summer, but misery in wet weather; fortunately there is no snow so far north, and no frost to speak of. On reaching the bush proper (primeval forest) a scene presents itself which gives the impression of even nature having gone wild. An undergrowth of almost impenetrable thickness, interlaced here and there with the supplejack ropes, *Rhipogonum scandens* (Maori name—Kariao), the root of which is not very unlike sarsaparilla, and is sometimes substituted for it by herbalists. Then there is the *Corynocarpus lævigata* (Maori name—Karaka), with its glossy green leaves and yellow berries; the seeds are an irritant poison, producing convulsions and contortions of the limbs. When any of the Maori children had eaten any of these seeds, their parents used frequently to cure them by administering emetics and burying them up to the neck in earth, to prevent contortions. After being steeped in water several weeks, the seeds form a portion of the Maori diet. We also noticed several tall specimens of *Dacrydium cupressinum* (Maori name—Rimu), with its fern-like foliage. The tree yields an astringent gum, and the bark is used by the natives as a styptic. In many cases the trees are encircled to the very top with the *Metrosideros robusta* (Maori name—Rata). In several cases the tree had succumbed and decayed, leaving a large hollow shell of interlaced rata. Here and there was left a noble kauri, the *Dammara australis*, one of which measured upward of 32 feet in circumference. The largest known specimen in the colony measures about 72 feet in circumference, reaches a height of 80 feet without a single branch, and is estimated to have taken about two thousand years to grow.

There were many other trees in an advanced state of decay, covered with parasites, which gave them a very weird appearance. Hillsides covered with tree ferns, *Cyathæa medullaris* (Maori name—Punga), hundreds or perhaps even thousands standing close together, with here and there a nikau palm with its pinkish flowers or red berries attached to the base of the leaves. The umbrella and scented ferns were also in abundance. The first half of our journey being completed at a place known as Big Muddy Creek, but on this occasion a small stream of very clear water, we halted and soon had a supply of hot tea and a fair supply of solids as lunch. The other half of the journey was very like the first half, until we reached the west coast with its rocks and boiling surf as far as the eye could see. It is common here on such excursions either to sleep out in the open air or to make use of an uninhabited gumdigger's hut, or disused wharè, not always the most desirable abode, as in many cases you are brought in contact with too many bedfellows in the shape of fleas. But Karè Karè has its idle saw mill and workmen's empty huts, in one of which we took up our abode. The furniture consisted of a rough kind of table, a form, and one or two boxes. Our beds were made on the floor of the wiry climber, *Lygodium articulatum* (Maori name—Mangèmangè), a few ti-tree twigs and rugs. Our cooking utensils were of the simplest description, tin cans (billies) and a few preserved meat tins playing a very important part. It was here we met with a camp of gumdiggers and had the opportunity of gaining most of the little information here given relative to the Kauri gum industry. They go out in parties of three or more, carrying with them their spades, spears, and bags, or they may have left their spades in the bush the night before. They usually went to their work between seven and eight o'clock in the morning, returning again about four o'clock in the afternoon, bringing with them what gum they had got. Friday was usually clearing up day, that is, they sorted and scraped their gum and bartered it in return for stores to the caretaker of the sawmill, drawing the balance in cash or cheque before going to town. The storekeeper in his turn sold it to the gum merchant.

There are two kinds of gum fields, the summer and the winter. It is usual to work on the ridges, that is, the higher ground, during the winter months, because then the rain softens the hard clayey ground and makes the labour much lighter; but in summer, when the ridges become too hard and the low-lying swamps sufficiently dry, they transfer their operations to them. The gum is found much nearer the surface on the ranges than in the swamps, being only a few inches below the surface, and sometimes even projecting above, whilst in the swamps it may be found to a depth of several feet, the soil of the higher ground having been washed away with the heavy rains and deposited in the swamps, burying the gum deeper each successive year. The spear is

a sharp pointed steel rod with a wooden handle, and this is thrust down into the earth to ascertain if gum is present. If gum is proved to be present, then digging commences and the whole spot dug over until they suppose they have got all the gum out. It usually occurs in very irregular, rough pieces, about the size of a hen's egg, looking like a piece of very rough clay. This, when the outside is scraped off with a pocket-knife, is the Kauri gum usually met with in commerce, and worth about 35*s*. per cwt. on the spot. The smaller pieces are only washed and dried and do not bring nearly such a good price. As a rule the scrapings are not saved, not being worth more than 20*s*. for a large sackful. They are used for lighting fires and making fire lighters. The gum fusing and burning soon sets the sticks and logs on fire, the gum giving off a white smoke and aromatic smell. Sometimes very large pieces, a cwt. or more, of transparent and almost colourless gum are found near the decayed root of a tree, probably the gum of the original tree. This brings a very much higher price, and is used for making personal ornaments. It is easily worked with a knife into any shape, and polished with a soft rag and kerosine oil. At times large masses of the gum may be found exuding from the living tree, but this gum is not so good for varnish-making as the fossil gum. Three or four thousand men are usually engaged in digging the gum, and can earn in districts where the gum is fairly plentiful 30*s*. to 40*s*. a week, and, as the cost of living is very small, they could easily save money; but, being cut off from all civilization whilst at work, they speedily spend and waste all their savings when they go to town. The gum is also found in considerable quantities, but of dark colour, in the coal deposits, showing the antiquity of the Kauri forests. There were 4920 tons of gum exported from Auckland in 1886, the value of which was £257,653, being at the rate of rather less than £2 12*s*. 0*d*. per cwt. The gum was dearer then than now, and there is the cost of packing, sorting, warehousing, carriage from the gum fields, and other expenses to be added to the first cost. The Kauri gum industry is confined to the North Island, as it is only in the north that the Kauri pine grows; thus the unemployed of Auckland are not so badly off as those in the south, always having the gum fields to fall back upon as a last resource; a last one on account of the hardships to be gone through, especially when there is a wife and family, and because an inexperienced digger may be a long time before he finds gum enough to find him with food. A very large portion of the Kauri forest having passed into the hands of a syndicate, it is very probable the gum digging will be regulated, and in all likelihood the price of the gum will advance.

Auckland, New Zealand.

CATECHU AND GAMBIER.*

BY HENRY TRIMBLE.

The extract of *Acacia Catechu* is known in commerce as *cutch*, and that from *Uncaria Gambier* as *gambier*; the former of these terms, therefore, will be used to indicate that officinal in the U.S.P., and the latter that of the Br.P. Catechu is a term applicable to either or both.

Considerable difficulty was experienced in finding gambier among the wholesale druggists, and such synonyms as "pale cutch" and "terra japonica" were tried, but either ordinary cutch was sent, or I was told they did not keep it.

It must be borne in mind that cutch is not imported primarily for use in medicine, but is brought in by hundreds of tons for the use of dyers. Gambier comes in cubes or masses of indistinct cubes, in equal, if not larger amounts than cutch, for the use of both dyers and tanners. Their prices are about the same, ranging from 5 to 8 cents per pound. All authorities agree that the medicinal use of these two remedies is for their astringent and very slight tonic properties; therefore, preference should be given to the one which possesses the greatest astringency.

A chemical examination of representative samples, as found in our market, was apparently the only method of solving the problem; therefore, the results of the examination of three samples of each will be given as a basis, although a number of others were partly examined in studying adulterations and searching for catechin.

No. 1. Cutch, "S. M." brand, in good repute in United States.

No. 2. Cutch, "M. M." brand, in good repute in England, and given me by a Bradford dyer.

No. 3. Cutch, brand not known, purchased of a wholesale drug firm in Philadelphia.

No. 4. Gambier, in masses, from a wholesale drug firm of Philadelphia.

No. 5. Gambier, in tubes, dark, direct from importer.

No. 6. Gambier, in tubes, light, direct from importer.

One gram of each was powdered and extracted in a Tollens apparatus, successively with boiling stronger ether and boiling absolute alcohol. The residue was percolated with cold distilled water as long as anything dissolved. The following is a summary of results in per cent.:—

Sample No.	1	2	3	4	5	6
Soluble in stronger ether	33·30	33·65	25·60	45·59	36·45	40·20
Soluble in absolute alcohol	22·08	22·63	31·78	26·80	32·28	28·25
Total by ether and alcohol	55·38	56·28	57·38	72·39	68·73	68·05
Soluble in water . .	27·40	29·01	20·50	10·13	15·20	16·05
Total solubility . .	82·78	85·29	77·88	82·52	83·93	84·50

It is usually stated in the books that the important constituents of these two drugs are catechin, soluble in ether, and catechu-tannic acid, soluble in water and alcohol, but insoluble in ether. If this be true, we would have a very ready method of determining the value of a sample; for, by simply adding those portions soluble in ether and alcohol, we would have the total available portion. That soluble in water after the above treatment, and so given in the chart, is mucilage with a part of the inorganic constituents, and forms no part of the most important pharmaceutical preparation—the tincture.

The sum by the first two solvents very closely indicates that which would be dissolved in making the tincture; but, as will be shown, it does not indicate the astringent value of the samples. A more accurate method for estimating the catechin, is to extract it by agitating the aqueous solution with ether. By this process the following percentages were obtained:—

Sample No. 1.	2·80	Sample No. 4.	12·64
Sample No. 2.	1·70	Sample No. 5.	7·76
Sample No. 3.	10·70	Sample No. 6.	19·76.

The aqueous residue from the agitation was warmed to expel ether, and treated in some cases with gelatin

* Read before the American Pharmaceutical Association at Detroit in answer to the query, "The U.S.P. denotes as catechu the extract of *Acacia Catechu*; the Br.P. uses the extract of *Uncaria Gambier*. Which of these two is to be preferred?"

and alum, in others with gelatin and ammonium chloride, to separate tannin. The results in all cases were low and unreliable.

Portions of the original samples were then treated with "hide powder," according to the method of Simand and Weiss (*Dingler's Polyt. Jour.*, 260, 564), and the results for tannin obtained, which, while not entirely satisfactory, are undoubtedly the best to be obtained with our present knowledge. The following are the percentages of tannin:—

No. 1.	31·94.	No. 4.	33·34
No. 2.	33·54.	No. 5.	47·18
No. 3.	25·50.	No. 6.	45·90.

By adding to these figures the amount of catechin, we get the total available value, and by then adding the mucilage, ash and moisture, and subtracting from 100, we find the per cent. of inert constituents.

Sample No.	Cutch.			Gambier.		
	1	2	3	4	5	6
Catechin	2·80	1·70	10·70	12·64	7·76	19·76
Catechu-tannic acid	31·94	33·54	25·50	33·34	47·18	45·90
Total valuable constituents	34·74	35·24	36·20	45·98	54·94	65·66
Mucilage	27·40	29·01	20 50	10·13	15·20	16·05
Ash	2·29	2·27	2·10	4·74	3·37	3 50
Moisture	12·50	12·20	15·36	10·33	11·03	9·90
Colouring and other inert matter	23·07	21·28	25·84	28·82	15·46	4 89
	100·00	100·00	100·00	100·00	100 00	100·00

Dr. A. Lehmann (Dissertation, Dorpat, 1880) examined a large number of samples of cutch and gambier, and found the catechin to vary from 13·8 to 33·8 per cent., and the catechu-tannic acid from 22·6 to 50·8 per cent. He was evidently able to procure better samples than the average that come to this country, although the results given in the above chart indicate the absence of intentional adulteration.

It has long been a statement in the text books that cutch and gambier are identical in chemical composition. It has, however, never been proven, and I am convinced that it is entirely erroneous. In the above samples no crystallized catechin could be obtained from samples 1 and 2, and only a small quantity from 3, while it readily crystallized from the aqueous solution of the ethereal extract of gambier. Both the physical appearance and the analysis indicate that there are important differences in the colouring matter of the two. This is further emphasized when we consider their respective commercial uses. The tanner selects gambier for his purpose, because he wishes tanning material without colour; the dyer prefers cutch, because he wants colouring matter as well as tannin, the colour in some cases being the more important of the two. From the published accounts of the methods of preparing these two drugs, it is impossible to believe they could be chemically identical.

Apart from their different botanical origin, the long continued heating necessary to extract cutch from the hard heart wood, is so different from that required to exhaust the more porous twigs and leaves of the gambier, that the evaporation in the case of the cutch is carried directly to dryness, the decomposition products being such as to prevent the "setting" of the mass as it does in the case of the gambier.

In the latter the concentration of the liquor is stopped when it reaches the consistency of syrup, and the liquid by stirring and cooling "sets" on account of separation of catechin, becoming of such solidity that it can be cut into blocks, and further dried at such a low temperature that comparatively little change takes place. When gambier comes in cubes it precludes a kind of adulteration which is extensively carried on with cutch, namely, the admixture of small stones, pieces of earthenware and bricks.

Such adulteration is liable to be overlooked in selecting samples for analysis, and is best indicated when a large lot is powdered and portions of this analysed.

Two samples of powdered cutch were examined, and yielded 14·01 and 18·20 per cent. of ash, which was made up of sand and crushed stones. These samples had been further reduced in value by the heat necessary to dry them previous to powdering, as is indicated by the following percentage results obtained by treatment with ether and alcohol:—

Sample No.	7	8
Soluble in ether	0·90	8·75
Soluble in absolute alcohol	9·93	17·50
Total valuable constituents	10·83	26·25
Mucilage, etc.	47·30	29·10
Ash	14·01	18·20
Moisture	14·10	7·30
Insoluble	13·76	19·15
	100·00	100·00

Gambier in cubes could not be so adulterated, and it is so dry as to be readily powdered in a mortar without previous heating to expel moisture. It is stated that gambier is adulterated by the addition of clay, but this admixture is probably not more common than it is with cutch; in both it may be detected by the amount of residue left on burning.

Another important point is to be observed in regard to cutch. There are on the market, for the use of dyers, several preparations under the name of "patent cutch," "purified cutch," etc., made by dissolving the commercial article in warm water, evaporating this aqueous solution, and adding some mordant, often potassium bichromate, to develope the colour for the dyer.

These preparations are liable to creep into the drug market, and if used in medicine do much harm. Such accidents would be impossible if cube gambier alone were used. British writers are singularly reticent about their reasons for preferring gambier, but it is probably in view of facts similar to those above given. The Edinburgh Pharmacopœia, about 1840, was the first to give the option of using the extract of Uncaria Gambier, as well as that of Acacia Catechu. When in 1864, the three British Pharmacopœias were incorporated under one name, both were retained under the distinct titles of "Catechu Pallidum," and "Catechu Nigrum," but in 1874 the latter was abandoned. The only English criticism I have been able to find on this change is by Mr. Peter Squire ('Companion to British Pharmacopœia,' 10th edition, page 85), who states that the black is the one adopted by other Pharmacopœias, and is preferred in the arts and manufactures. It is well known "to be by far superior to the pale in astringency, and always to be had of good quality; it is therefore a matter of surprise and regret that it has been rejected from the British Pharmacopœia."

Notwithstanding this adverse opinion, which appears to be only an opinion, if the committee on revision of the U. S. P. will make the change to gambier in cubes, and include in addition to the requirements of the Br. P., that it shall not yield over 5 per cent. of ash, I believe it would be preferable, for the following reasons:—

1. Gambier has more available astringency.
2. If in cubes it cannot be so easily adulterated.
3. Being more carefully dried it is more easily powdered than cutch, and without the further application of heat.
4. The cubes are more uniform in composition, and are not liable to contain mordants added for the use of dyers.

ELECTRO-MAGNETIC PHENOMENA.*

BY PROFESSOR G. F. FITZGERALD, M.A., F.R.S.

In a presidential address on the borderlands of the known delivered from this chair the great Clerk Maxwell spoke of as an undecided question whether electro-magnetic phenomena are due to a direct action at a distance or are due to the action of an intervening medium. The year 1888 will be ever memorable as the year in which this great question has been experimentally decided by Hertz in Germany and, I hope, by others in England. It has been decided in favour of the hypothesis that these actions take place by means of an intervening medium. Although there is nothing new about the question, and although most workers at it have long been practically satisfied that electro-magnetic actions are due to an intervening medium, I have thought it worth while to try and explain to others who may not have considered the problem what the problem is and how it has been solved.

Rowland's experiment proving an electro-magnetic action between electric charges depending on their absolute and not relative velocities has already proved the existence of a medium relative to which the motion must take place, but the connection is rather metaphysical and is too indirect to attract general attention. The importance of the striking experiments was that they put the language of the wrong hypothesis out of fashion. Elementary text-books that halted between two opinions, and, after the manner of text-books, leant towards that enunciated in preceding text-books, had all perforce to give prominence to the true theory, and the whole rising generation began their researches from a firm and true standpoint. I anticipate the same results to follow Hertz's experimental demonstration of a medium by which electro-magnetic actions are produced. Text-books which have gradually been invoking lines of force, in some respects to the aid of learners and in others to their bewilderment, will now fearlessly discourse of the stresses in the ether that cause electric and magnetic force. The younger generation will see clearly in electro-magnetic phenomena the working of the all-pervading ether, and this will give them a firm and true standpoint for further advances.

An illustrative example may make the question itself clearer, and so lead to understand the answer better. In colloquial language we say that balloons, hot air, etc., rise because they are light. In old times this was stated more explicitly, and therefore much more clearly. It was said that they possessed a quality called "levity." "Levity" was opposed to "heaviness." Heaviness made things tend downwards, levity made things tend upwards. It was a sort of action at a distance. At least it would have required such a hypothesis if it had survived until it was known that heaviness was due to the action of the earth. I expect levity would have been attributed to the direct action of heaven. It was comparatively recently in the history of mankind that the rising of hot air, flames, etc., was attributed to the air. Everybody knew that there was air, but it was not supposed that the upward motion of flames was due to it. We now know that this and the rising of balloons are due to the difference of pressure at different levels in the air. In a similar way we have long known that there is an ether, an all-pervading medium, occupying all known space. Its existence is a necessary consequence of the undulatory theory of light. People who think a little but not much sometimes ask me, "Why do you believe in the ether? What's the good of it?" I ask them, "What becomes of light for the eight minutes after it has left the sun and before it reaches the earth?" When they consider that they observe how necessary the ether is. If light took no time to come from the sun there would be no need of the ether. That it is a vibratory phenomenon, that it is affected by matter it acts through—these could be explained by action at a distance very well. The phenomena of interference would, however, require such complicated and curious laws of action at a distance as practically to put such a hypothesis out of court or else be purely mathematical expressions for wave propagation. In fact, anything except propagation in time is explicable by action at a distance. It is the same in the case of electro-magnetic actions. There were two hypotheses as to the causes of electro-magnetic actions. One attributed electric attraction to a property of a thing called electricity, to attract at a distance, the other attributed it to a pull exerted by means of the ether, somewhat in the way that air pushes balloons up. We do not know what the structure of the ether is by means of which it can pull, but neither do we know what the structure of a piece of indiarubber is by means of which it can pull, and we might as well ignore the indiarubber, though we know a lot about the laws of its action, because we do not know its structure, as to ignore the ether because we do not know its structure. Anyway, what was wanted was an experiment to decide between the hypothesis of direct action at a distance and of action by means of a medium. At the time that Clerk Maxwell delivered his address no experiment was known that could decide between the two hypotheses. Specific inductive capacity, the action of intervening matter, the delay in telegraphing, the time propagation of electro-magnetic actions by means of conducting material—these were known, but he knew that they could be explained by means of action at a distance, and had been so explained. Waves in a conductor do not necessarily postulate action through a medium such as the ether. When we are dealing with a conductor and a thing called electricity running over its surface, we are, of course, postulating a medium on or in the conductor, but not outside it, which is the special point at issue. Clerk Maxwell *believed* that just as the same air that transmits sound is able by differences of pressure—*i.e.*, by means of its energy per unit volume—to move bodies immersed in it, so the same ether that transmits light causes electrified bodies to move by means of its energy per unit volume. He believed this, but there was no experiment known then to decide between this hypothesis and that of direct action at a distance. As I have endeavoured to impress upon you, no *experimentum crucis* between the hypotheses is possible except an experiment proving propagation in time either directly, or indirectly by an experiment exhibiting phenomena like those of the interference of light. A theorist may speak of propagation of actions in time without talking of a medium. This is all very well in mathematical formulæ, but, as in the case of light, we must consider what becomes of it after it has left the sun and before it reaches the earth, so every hypothesis assuming action in time really postulates a medium, whether we talk about it or not. There are some difficulties surrounding the complete interpretation of some of Hertz's experiments. The conditions are complicated, but I confidently expect that they will lead to a decision on most of the outstanding questions on the theory of electro-magnetic action. However, there is no doubt that he has observed the interference of electro-magnetic waves quite analogous to those of light, and that he has proved that electro-magnetic actions are propagated in air with the velocity of light. By a beautiful device Hertz has produced rapidly alternating currents of such frequency that their wave length is only about two metres. I may pause for a minute to call your attention to what that means. These waves are propagated

* Extract from the Presidential Address to the Mathematical and Physical Section of the British Association at Bath.

three hundred thousand kilometres in a second. If they vibrated three hundred thousand times a second the waves would be each a kilometre long. This rate of vibration is much higher than the highest audible note, and yet the waves are much too long to be manageable. We want a vibration about a thousand times as fast again with waves about a metre long. Hertz produced such vibrations, vibrating more than a hundred million times a second. That is, there are as many vibrations in one second as there are seconds—in a day? No, far more. In a week? No, more even than that. The pendulum of a clock ticking seconds would have to vibrate for four months before it would vibrate as often as one of Hertz's vibrators vibrates in one second. And how did he detect the vibrations and their interference? He could not see them; they are much too slow for that; they should go about a million times as fast again to be visible. He could not hear them; they are much too quick for that. If they went a million times more slowly they would be well heard. He made use of the principle of resonance. You all understand how by a succession of well-timed small impulses a large vibration may be set up. It explains many things, from speech to spectrum analysis. It is related that a former Marquess of Waterford used the principle to overturn lamp-posts; his ambition soared above knocker-wrenching. So that it is a principle known to others besides scientific men. Hertz constructed a circuit whose period of vibration for electric currents was the same as that of his generating vibrator, and he was able to see sparks, due to the induced vibration, leaping across a small air-space in this resonant circuit. The well-timed electrical impulses broke down the air-resistance just as those of my Lord of Waterford broke down the lamp-post. The combination of a vibrating generating circuit with a resonant-receiving circuit is one that I spoke of at the meeting of the British Association at Southport as one by which this very question might be studied. At the time I did not see any feasible way of detecting the induced resonance; I did not anticipate that it could produce sparks. By its means, however, Hertz has been able to observe the interference between waves incident on a wall and the reflected waves. He placed his generating vibrator several wave lengths away from a wall, and placed the receiving resonant circuit between the generator and the wall, and in this air-space he was able to observe that at some points there were hardly any induced sparks, but at other and greater distances from his generator they reappeared to disappear again in regular succession at equal intervals between his generator and the wall. It is exactly the same phenomenon as what are known as Lloyd's bands in optics, which are due to the interference between a direct and a reflected wave. It follows hence that, just as Young's and Fresnell's researches on the interference of light prove the undulatory theory of optics, so Hertz's experiment proves the ethereal theory of electro-magnetism. It is a splendid result. Henceforth I hope no learner will fail to be impressed with the theory—hypothesis no longer—that electro-magnetic actions are due to a medium pervading all known space, and that it is the same medium as the one by which light is propagated, that non-conductors can, and probably always do, as Professor Poynting has taught us, transmit electro-magnetic energy. By means of variable currents energy *is* propagated into space with the velocity of light. The rotation of the earth is being slowly stopped by the diurnal rotation of its magnetic poles. This seems a hopeful direction in which to look for an explanation of the secular precession of terrestrial magnetism. It is quite different from Edlund's curious hypothesis that free space is a perfect conductor. If this were true, there would be a pair of great antipoles outside the air, and terrestrial magnetism would not be much like what it is, and I think the earth would have stopped rotating long ago. With alternating currents we *do* propagate energy through non-conductors. It seems almost as if our future telegraph cables would be pipes. Just as the long sound waves in speaking tubes go round corners, so these electro-magnetic waves go round corners if they are not too sharp. Professor Lodge will probably have something to tell us on this point in connection with lightning conductors. The silvered glass-bars used by surgeons to conduct light are exactly what I am describing. They are a glass, a non-conducting, and therefore transparent, bar surrounded by a conducting, and therefore opaque, silver sheath, and they transmit the rapidly alternating currents we call light. There would not be the same difficulty in utilizing the energy of these electro-magnetic waves as in utilizing radiant heat. Having all the vibrations of the same period we might utilize Hertz's resonating circuits, and in any case the second law of thermodynamics would not trouble us when we could practically attain to the absolute zero of these, as compared with heat, long period vibrations.

We seem to be approaching a theory as to the structure of the ether. There are difficulties from diffusion in the simple theory that it is a fluid full of motion, a sort of vortex sponge. There were similar difficulties in the wave theory of light owing to wave propagation round corners, and there is as great a difficulty in the jelly theory of the ether arising from the freedom of motion of matter through it. It may be found that there is diffusion or it may be found that there are polarized distributions of fluid kinetic energy which are not unstable when the surfaces are fixed; more than one such is known. Osborne Reynolds has pointed out another, though in my opinion less hopeful, direction in which to look for a theory of the ether. Hard particles are abominations. Perhaps the impenetrability of a vortex would suffice. Oliver Lodge speaks confidently of a sort of chemical union of two opposite kinds of elements forming the ether. The opposite sides of a vortex ring might perchance suit; or may be the ether, after all, is but an atmosphere of some infra-hydrogen element: these two latter hypotheses may both come to the same thing. Anyway we are learning daily what sort of properties the ether must have. It must be the means of propagation of light; it must be the means by which electric and magnetic forces exist; it should explain chemical actions and, if possible, gravity.

On the vortex-sponge theory of the ether there is no real difficulty by reason of complexity why it should not explain chemical actions. In fact, there is every reason to expect that very much more complex actions would take place at distances comparable with the size of the vortices than at the distances at which we study the simple phenomena of electro-magnetism. Indeed, if vortices can make a small piece of strong elastic solid we can make watches and build steam engines and any amount of complex machinery, so that complexity can be no essential difficulty. Similarly the instantaneous propagation of gravity, if it exists, is not an essential difficulty, for vortices each occupy all space, and they act on one another simultaneously everywhere. The theory that material atoms are simple vortex rings in a perfect liquid otherwise unmoving is insufficient; but with the innumerable possibilities of fluid motion it seems almost impossible but that an explanation of the properties of the universe will be found in this conception. Anything purporting to be an explanation founded on such ideas as "an inherent property of matter to attract," or building up big elastic solids out of little ones, is not of the nature of an ultimate explanation at all; it can only be a temporary stopping place. There are metaphysical grounds, too, for reducing matter to motion and potential to kinetic energy.

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PHARMACEUTICAL EDUCATION IN THE UNITED STATES.

WE are so accustomed to hear of the multitude of colleges of pharmacy in the United States, and of the large number of students attending them, that there is no little danger of inferring the existence, so far as educational conditions are concerned, of a much better state of affairs in that country than in our own. But it is questionable whether there is really any ground for thinking such to be the case, and some papers read before the late meeting of the American Pharmaceutical Association at Detroit go far towards justifying the doubt whether the provision for pharmaceutical education in the United States is in fact much, if at all, better than it is with ourselves. Such at least appears to be the indication afforded by the papers we have referred to, and more especially by one that was read by Mr. E. S. BASTIN, one of the teachers connected with the Chicago College of Pharmacy. Before entering upon the subject which he had been requested to deal with by the Secretary of the Section on Pharmaceutical Education, Mr. BASTIN mentions the fact that he has been for some twelve years engaged in the work of instruction, and within that period has had probably as many as two thousand students. It is evident therefore that his experience has been extensive, and that he may be expected to understand something of the qualification and needs of the average pharmaceutical student. Besides that personal acquaintance with the subject in a practical form, Mr. BASTIN has taken considerable pains to acquaint himself with what is being done for such students in the various colleges of pharmacy throughout the country, and is thus in a position to speak with some confidence regarding the changes needed in the system of pharmaceutical education. Since the project of improving the educational conditions in this country is now a matter of great interest, it may be useful to inquire whether some useful assistance may not be obtained from a consideration of the circumstances to which attention is directed in Mr. BASTIN'S paper.

As a first principle it is assumed by the author that pharmacy can never acquire a position of equality with the learned professions until the requirements for entering upon that occupation are very considerably raised, and it is with regard to the possible attainment of that object that his remarks are offered. Speaking with the experience of a teacher, he therefore deplores the fact that the majority of the students admitted to colleges of pharmacy are wanting in any adequate preparation. In many cases they are admitted without examination, or even the moderate requirement of a certificate from their school teachers that they have passed successfully through the ordinary branches of study of a grammar school. The consequence is that many of the students admitted are entirely unfit to grapple with such subjects as chemistry, physics, botany, and many of the branches of pharmacy. So far as his observation goes not one-fifth of the applicants for matriculation have pursued a high school course, not more than one-tenth are high school graduates, and not more than one in fifty are college graduates, while a very considerable percentage of applicants have not even a good knowledge of reading, writing and arithmetic. The state of things obtaining in the United States is therefore very much a counterpart of what prevails with ourselves. It is the defective school education of the youths entering upon a pharmaceutical career that is the difficulty lying at the root of all the subsequent failures to reach such a standard of qualification and culture as is requisite for the desired advancement of pharmacy. In some of the colleges it is stated that the requirements for admission to a pharmaceutical course are something nearer what they should be, but these colleges are exceptions to the more general practice, and they are not well attended, for the obvious reason that the average student is inclined to go where he can "get through" easiest. To some extent this is no doubt due to the large number of colleges in the United States, and to the increasing competition between them for students. The consequent temptation to admit students that are insufficiently prepared, and to graduate as large a number as possible, is spoken of by Mr. BASTIN as being likely to produce such quack mills as have so long disgraced the medical profession in America unless something be done to stem the tendency in that direction. From this representation of the condition of pharmaceutical education in the States, it will therefore be seen that there is not much to choose between that obtaining there and in our own country. In both cases the promotion of the interests of pharmacy requires that greater attention should be devoted to ensuring the better general education of those who enter upon its pursuit. If, to use the words of Mr. BASTIN, pharmacy is to take rank with the legal, medical and engineering professions, if the practice of pharmacy is not to degenerate into mere shopkeeping upon

a level with the grocery and notion business, it is imperative that a larger proportion of the men entering it should be better equipped both educationally and scientifically. It is time, therefore, that pharmaceutical education should be placed upon a higher level than it now occupies.

A further evil of the present situation in the United States is to be found in the character of the instruction given in some of the colleges of pharmacy. Most of them cling tenaciously to the lecture system, and practical training is too much neglected. Then again the courses of study in most of the colleges are too short. Two brief terms of from twenty to thirty weeks are all that is required in the majority of them, and in some the second course consists in a substantial repetition of the lectures given in the first. The fact regarding most of the colleges is that students are admitted poorly prepared, having little mental discipline and little ability to cope with the different subjects taught, so that the course of study so far as its results to the student and the profession are concerned is little short of a sham. And though most colleges, in addition, exact of the applicant for graduation that he should have had three or four years' experience in a drug store before they honour him with a diploma, Mr. Bastin considers it is safe to say that the "experience" gained in many drug stores should be counted a positive damage rather than a benefit to the student. In answer to the question how the present shortcomings of pharmaceutical education are to be remedied, Mr. Bastin suggests that with the support of the American Pharmaceutical Association there should be a united effort on the part of the colleges to raise the requirements for admission and to improve the quality and extend the time of the courses of study. He recommends that the requirements for admission should comprise at least a thorough knowledge of the branches taught in a good grammar school course, a knowledge of elementary physics, and a sufficient acquaintance with Latin to understand its use in scientific nomenclature, to readily trace the meaning of words derived from Latin roots, to understand the modes of inflecting nouns, adjectives and verbs, and to translate simple Latin sentences. Without at least as much preliminary preparation as that it is not, in his opinion, possible for a student to pursue a course of study in pharmacy to advantage. As regards the course of college instruction, he suggests that it should consist of at least two terms of forty weeks each, corresponding to what is termed the school year in most educational institutions. In concluding his paper Mr. Bastin expresses his conviction that experienced teachers in colleges of pharmacy will agree with him in the main. He does not doubt that they feel the need of such reforms, whatever they may think of the practicability of bringing them about, and he thinks that the influence of the American Pharmaceutical Association may be brought to bear so as to ensure a successful result, which would eventually have a wholesome influence on State boards of pharmacy. There is much in this critical review of the condition of pharmaceutical education in the United States that is instructive and of interest in its application to the circumstances of this country. There is sufficient evidence to enforce the lesson that the mere multiplication of schools and colleges will not alone suffice to bring about the reform that is needed, but that without a sound system of control exercised by a central authority the increase in the number of schools may really aggravate the evil of defective education rather than remove it.

The permission lately given by the Customs authorities to use damaged tea for the preparation of caffeine without payment of duty has placed English manufacturers in the position of being able to turn this waste material to account for the extraction of the alkaloid, and the *Pharmaceutische Zeitung* anticipates that the increased production of caffeine thus rendered possible will induce English physicians to employ it more largely. It is also probable that instead of having to draw our supply of this article from Germany, as has been the case hitherto, we shall be enabled to export it to the continent and to America, where it is much used for medicinal purposes. The experience thus gained of benefit to English industry by considerate concessions from the Government may perhaps operate beneficially towards the extension of such procedure, and among other things it may induce the Government to adopt a similar course in the matter of drawback on spirit for the benefit of the makers of tinctures, etc., for export. At present they are placed at great disadvantage in this respect as compared with foreign competitors.

* * *

A question as to the admissibility of the use of benzoic acid for the conservation of alimentary materials has recently been submitted to the consideration of the consultative committee of public hygiene in France. According to the report presented by M. Pouchet it has been decided that the use of benzoic acid should not be allowed for the preservation of beer or of any other alimentary material. The grounds upon which this decision was arrived at were that substances having antiseptic properties are prejudicial to the normal exercise of the digestive function, and that the addition of antifermentescible substances, of any kind whatever, to alimentary materials is irrational from the point of view of nutrition, besides being otherwise capable of occasioning more or less serious interference with the well-being and regular action of the digestive organs.

* * *

The Midland Counties Chemists' Association will hold its first monthly meeting for the present session at the Mason College, Birmingham, on Tuesday evening next, the 23rd inst., at half-past eight, when the President, Mr. George E. Perry, will deliver the inaugural sessional address.

* * *

The first meeting this session of the Edinburgh Chemists' Assistants and Apprentices' Association will be held on Wednesday evening, the 24th inst., at 8.45 o'clock, at 36, York Place, when Mr. George Coull, President of the Association, will deliver an inaugural sessional address and the "botanical excursions prize" will be presented.

British Pharmaceutical Conference.

TWENTY-FIFTH ANNUAL MEETING.
SECOND DAY'S PROCEEDINGS.

Wednesday, September 5.

(*Concluded from page* 300.)

The Bell and Hills' Gift of Books.

The President said the munificence of Mr. Thomas Hyde Hills placed it in the power of the Conference to present each year to the local association, if there were one, in the town or city where the Conference met, £10 worth of books. Unfortunately, in Bath there was no active association at the time the preliminary arrangements were being made; and the Bath Royal Literary and Scientific Society had kindly consented to accept the books and the conditions which accompanied them, viz., that they should be at the service of any pharmacist in Bath who would make use of them. He had therefore great pleasure in presenting to the Bath Literary and Scientific Institution the books on the table. The President of that Institution, Mr. Murch, and the Honorary Secretary, Mr. Plowman, would kindly take charge of them.

Mr. Murch said he highly valued the privilege of being invited to this interesting and important meeting. Under any circumstances he should have valued the opportunity of being face to face with the Society, of whose reputation he had long been aware, and of whose usefulness the records of twenty-four years gave ample proof. It was his good fortune to be Mayor of Bath in the year 1864, when the Pharmaceutical Conference met there before, and he had very pleasing recollections of the interest awakened in the Society on that occasion. His only regret was that the too absorbing nature of the visit of the British Association had prevented his fellow-citizens showing that hospitality and giving that welcome to the Conference which they would all have desired to do. On behalf of the Bath Literary and Scientific Society he felt a peculiar pleasure also in being present. It was exceedingly kind and thoughtful to remember the Institution in connection with the valuable present which it was now proposed to make. For nearly thirty years he had had the honour of being President of that Institution, and could therefore bear testimony to the gratification which would be experienced by the announcement of this gift, and to the use which it would be to the Institution itself, and the city generally. The executive would be exceedingly glad to make known to the members and citizens that this present had been made and to give ample facilities for the books to be consulted. The Institute had a very fair literary character, and in some departments of science, especially in geology, had obtained no common reputation, but it had been the aim of the managers for some time to make it more thoroughly scientific, and if they could extend the interest in the subjects in which the Conference was specially interested they would all be very glad to do so.

Mr. Plowman, as Honorary Secretary to the Institution, said it would be open to all members of the Conference during the visit, and it would be a great pleasure to himself, and every official connected with it, to do anything which might tend to make the visit of the Conference to Bath more agreeable than it otherwise might be. It would give him great pleasure to place these books in a position where they might be conveniently consulted by those members of the profession who might at any time desire to do so.

Place of Meeting for 1889.

Mr. Martin said it was the custom of the Conference to visit the same town and at the same time as the British Association, and an invitation had already been given to and accepted by the British Association to meet in Newcastle-on-Tyne in 1889. Some chemists in Newcastle being aware of this fact took the initiative, and in obedience to the summons of Mr. Barnard Proctor a large meeting was convened, a committee formed with officers and all the requisites for sending a deputation to this Conference. That deputation consisted of himself and Mr. Harrison, of Sunderland, whose absence he extremely regretted, and their instructions were to give a cordial and hearty invitation to the Conference to visit Newcastle in 1889. With regard to the serious business of the Conference, he saw from the arrangements of the day that the officers would not be elected until after this invitation had been disposed of, and therefore he could not predict upon whom their suffrages would fall as to the President, but if he might judge from the precedent of many eminent names he had not the least doubt that the President's address alone would be worth the visit, and he hoped on such an interesting occasion many competent and able pharmacists would give papers which would make the meeting a success. When he reached Bath on the Monday evening, for the first four or five hours his spirits fell, and he felt very much in the position of the prophet Jonah, and inclined to take refuge in flight; but having visited the Roman remains and seen that they consisted of baths and villas, his courage returned, for he perceived that the Romans who lived in Bath in former times were a wealthy and luxurious set of men; but he could tell them that in the neighbourhood of Newcastle there were Roman remains of a different character, a chain of forts built by Agricola and a wall, known as Hadrian's Wall, which extended from the Tyne to the Solway, so that any interested in antiquities who might visit Newcastle could commence at Wallsend on the Tyne, and for sixty miles with very slight deviations could walk on Hadrian's Wall. On the score of Roman remains therefore Newcastle could hold its own with Bath. With regard to the other beauties he only wished that the time at his disposal, and his own ability, could enable him to do one tithe the justice it deserved to the grand old town of Newcastle-on-Tyne. The town itself was modern, with very fine business streets, but also with features of an old town which were extremely interesting, though they were rapidly disappearing. In 1863 the *Times* stated that, "In its way there is no river in the world which presents such a a wonderful picture of manufacturing industry as the Tyne," and if that were true then how much more was it true now. Since that time the Tyne Commissioners have dredged out about 70,000,000 tons of mud and sand, and made the river one of the noblest waterways in the kingdom. In 1863 a ship of 100 tons burden was stranded in the river; but in 1885 a vessel of 10,500 tons was launched successfully and towed down the river from two and a half miles above the bridge, so that the river itself was worth seeing, although it might not, at Newcastle, possess the picturesque features of the Severn, Wye or Avon. It was also famous for shipbuilding, being only second and sometimes the first in the kingdom. The Clyde surpassed it in the number of vessels, but the Tyne was frequently ahead in tonnage. In Newcastle they also manufactured 100-ton guns and swift cruisers, and in addition to shipbuilding it was eminent for engineering. Very many who attended that Conference had travelled by train, and Newcastle was the home of the locomotive; it boasted the name of Stephenson, and still had the Stephenson factory. It had recently beaten the record of speed in travelling, for a train had gone from Newcastle to Edinburgh, 127 miles, in 126 minutes. The chemical trade again was largely represented on the Tyne. They were told that the Leblanc process was doomed; but it was dying hard, fighting with its back to the wall, and those who wanted to see the last of it had better

come to Newcastle. In addition to that there were many smaller industries, not forgetting coal, though in August and September Sol might be expected to be very kind to them; but they could visit the coal mines and docks, and see arrangements for shipping, loading and exporting the coal. The North Tyne was exceedingly picturesque. There was also the Cathedral of Durham in the neighbourhood and Alnwick Castle, and if the Local Committee had any difficulty at all it would be to select places where visitors should be taken. If on that occasion the Conference could vary the rule, and stay two or three days longer, he thought they could manage to interest the members every day. He did not wish to anticipate the arrangements of the Local Committee, but he thought of late years the important scientific experiments of many of the members on the Tuesday evening, which necessitated their withdrawal from the ladies, might have operated to prevent ladies attending the Conference in the numbers they would have done, and he hoped in Newcastle it would be possible to form a Ladies' Committee which would provide agreeable entertainment for the ladies during the time when the gentlemen were engaged in their scientific pursuits. He was sensible that he very inadequately represented the claims of Newcastle, but there were two points more he should like to mention. In coming to Newcastle they would be visiting their home, their place of birth, and he could assure them that the heart of Newcastle beat with parental affection to the Conference. Out of many things of which it might be proud, not the least was that the British Pharmaceutical Conference was born there. The other point was that in the name of north country hospitality he begged them to come to the north. They were told, *ad nauseam* perhaps, that pharmacy had fallen on evil days, that pharmaceutical chemists could no longer afford to be hospitable. But if he understood the word "hospitality" aright, it did not consist in lavish ostentatious display of wealth or the products of wealth; it rather consisted in the sympathy of warm hearts, and the cordial reciprocation of kindly feelings. That was the form of hospitality which they received in every town they visited, and which he was sure they would experience in still larger measure in Newcastle, and for these reasons he hoped his invitation would be accepted. He was only sorry that Mr. Harrison, of Sunderland, was not present to support him in giving the invitation.

Mr. CLAGUE said he also was very sorry that Mr. Harrison was not present to support Mr. Martin, but in his absence he should like to add just a word or two. Although Mr. Martin called it a town, it was a city and a county in itself, and in this particular instance it had the assistance of two other counties besides, and the whole district was ardently interested in the prospect of the Conference coming there next year. On the Tyne side there was almost an extension of Newcastle from the high level bridge straight down to the sea, and on both sides of the river, so that they represented a very large constituency in giving this invitation. The natural advantages of Newcastle were very much greater than some of the young members of the Conference would be aware of. His own idea in going there was that it would be a very busy and somewhat dirty place, but it was nothing of the kind. The country round was beautiful, even Bath itself could not show better parks, and in many other respects it was a more interesting and rural neighbourhood, and he endorsed all that had been said by Mr. Martin. The hospitality of the north was too well known to require any praise from him; he had experienced it himself, and invited the Conference very cordially to do as he had done and test it. Newcastle was the birth place of the Conference, and a great many who were not able to come to Bath were very anxious to see its big baby come back. The universal feeling was—

"Better loved ye canna be,
Will ye no come back again."

Dr. THRESH then moved that the invitation so cordially presented by Mr. Martin and Mr. Clague be accepted. If they had had the eloquence of Mr. Harrison thrown in he feared they would have been anxious to be off to the north immediately. Every one there must know something of the hospitality of their northern friends, and when they considered that and the fact that the Conference first saw the light there, he was sure the younger members like himself would be only too delighted to go and visit the place of its birth, a delight which would be equally shared by the older members who had had the pleasure of attending that first meeting which had so often been alluded to.

Mr. WOOLLEY had great pleasure in seconding the resolution. There was one reason why every pharmacist and every member of the Conference ought to make a point of attending the meeting at Newcastle next year, and that was to do honour through Newcastle to those men who had founded the Conference, which had been the means of doing so much good during the last twenty-five years.

The PRESIDENT said he had received a letter from Mr. Harrison, of Sunderland, most cordially supporting the invitation. He (the President) looked forward to the visit of the Conference to its birthplace with much pleasure. It was not going home worn out and feeble to die, but to demonstrate its healthy vitality.

The motion was carried by acclamation.

THE UNOFFICIAL FORMULARY COMMITTEE.

The PRESIDENT moved the re-appointment of the Unofficial Formulary Committee, the members being willing to continue the work. They all knew the success which had attended the publication of that Unofficial Formulary, and the Committee only asked for the addition of a few words to the resolution in order to give them liberty to publish something if it was felt desirable before the next meeting of the Conference. The words were these:—

> "That in case of urgency the Formulary Committee have the discretionary power to publish formulæ provisionally, provided seven of the Committee vote for them, and that these formulæ be subjected to revision, if necessary, before being presented in the report of the Executive."

With that addition he moved the re-appointment of the Committee, consisting of Messrs. Martindale, Naylor, Abraham, Greenish, Groves, Maben, Martin, Reynolds, Symes, and Dr. Thresh.

Mr. CONROY, in seconding the motion, said it would be difficult to find gentlemen more competent to undertake the work, and he was very pleased that they were willing to continue it.

Mr. SCHACHT asked why it was necessary to modify the conditions of the appointment. He felt a little bit of anxiety about anything being published in the name of the Conference which had not its entire sanction.

The PRESIDENT said it was simply to provide for a case of urgency, when no Committee was likely to be called, as sometimes happened for a month or two. The wish had been expressed by the Committee and not by the Conference.

Mr. ROBINSON said the feeling expressed by Mr. Schacht was shared by others. Did it mean publishing to the world the opinions shared by seven members and not by the other three?

The PRESIDENT said the formulæ would be submitted to the whole of the Committee.

Mr. ROBINSON feared the publication of formulæ before the annual meeting would interfere with the sale of the annual publication.

Mr. MARTINDALE said it was only in case a new drug came into existence, and the Committee thought

it was desirable to give some indication of what the strength of the preparation should be. It was simply to enable the Committee to give a provisional formula that members might follow until it was presented to the Executive and approved.

The motion was then put and carried unanimously.

Election of Officers.

Mr. Groves said it had been usual to save time and prevent confusion to have a list prepared of the officers proposed for the coming year. He had such a list, which he would hand to the President, and which the President would read, and if no other was handed in it would be taken as accepted, though of course it was open to any member to move any amendment he chose, in which case a ballot would be taken.

The President then read the list as follows :—

President :—C. Umney.

Vice-Presidents :—M. Carteighe, S. Plowman, C. Symes and N. H. Martin.

Treasurer :—W. Martindale.

Honorary General Secretaries :—J. C. Thresh and W. A. H. Naylor.

Other Members of the Executive Committee :—J. E. Brunker, M. Conroy, R. H. Davies, D. B. Dott, A. W. Gerrard, J. Harrison, T. Maben, B. S. Proctor and F. Ransom.

Local Secretary :—T. M. Clague.

Auditors :—J. Wilson and T. Rheeder.

No amendment being offered the President declared the above elected.

Votes of Thanks.

Mr. Greenish moved—

"That the cordial thanks of the members of the British Pharmaceutical Conference be given to Mr. Hutton, the honorary Local Secretary, for the very successful way in which the arrangements connected with the visit of the Conference to Bath had been made and carried out."

It required but very few words from him to support this motion, but it was only the members of the Executive Committee who could properly appreciate the services of Mr. Hutton on this occasion. He had shown a great capacity for organization, and the energy with which he had done his work had been beyond all praise. The successful manner in which the meeting had been conducted was mainly due to the arrangements made by Mr. Hutton.

Mr. Naylor seconded the motion with great pleasure. He reminded the meeting that the duties of a local secretary extended over a considerable period, and that the arrangements which had been so perfect, and had conduced so largely to their comfort, had been in progress for some considerable time. The general secretaries of the Conference were necessarily brought into close and frequent contact with the local secretaries, and he could say personally that it had been very pleasing to work with Mr. Hutton in this matter, and they would all agree that he had done the work in a splendid fashion.

The President in putting the motion said he should like to add a word, because he had had some rather special qualifications for doing so. In the first place he had been a local secretary himself and knew what it meant. In the second place from frequent correspondence with Mr. Hutton, and having to pay a visit to Bath, he had had opportunities of seeing how much there had been to do, and he knew the unselfish and excellent manner in which Mr. Hutton had done it.

The motion was carried by acclamation.

Mr. Hutton in response said it had given him very great pleasure to make the arrangements, and everything had gone so well that he almost envied Mr. Clague's position next year.

Mr. Plowman then proposed—

"That the best thanks of the Conference be given to the Mayor and corporation of Bath for placing the banqueting hall of the Guildhall at the disposal of the Conference for luncheons during the visit of the Conference."

The pleasant surroundings in which the luncheons had been served had been a great addition to the comfort of the members, and they were greatly indebted to the mayor and corporation for the privileges afforded them.

Mr. Martin seconded the motion, and also desired to add his thanks to the mayor for his visit, and the expression of welcome on the opening day.

The motion was carried unanimously.

Dr. Symes then moved—

"That the hearty thanks of the Conference be accorded to the Royal Literary and Scientific Society for the use of the Museum and reading-rooms, etc., and to Mr. Radway of the Grand Pump Hotel for the use of the hotel assembly room for the meetings of the Conference."

The Scientific Institution was one of which Bath might be proud. It had existed some sixty or seventy years, having been founded in days when scientific and literary institutions were not so abundant and popular as in the present day. He hoped many of the members of the Conference had availed themselves of the privileges afforded by the institution. In going through it he found that it possessed some 11,000 or 12,000 volumes of general literature, a special scientific library of some 2000 volumes on deposit by the Rev. Leonard Jennings, a botanic library, left by a former resident in the neighbourhood, Mr. Broome, and a local museum. There was also a geological museum, and every facility had been given to the members of the Conference to avail themselves of these advantages. A great deal of the success of the gathering depended on the place in which the meeting was held, and the room in which the Conference was assembled, and which had been placed at its disposal by Mr. Radway, was everything which could be desired, so that he thoroughly deserved the thanks of the Conference.

Mr. Dott seconded the motion, which was carried unanimously.

Mr. Groves then moved—

"That the hearty thanks of the Conference be accorded to the President for the very able and courteous manner in which he had conducted the business of the meeting."

He felt very much tempted to sit down immediately, seeing the warmth with which the motion was received, but it would not be complimentary to the President if he did not say some words in acknowledgment of his very able services in the chair. Not only had his ability been highly marked, but his courtesy was equally marked, and his facility of expression and general urbanity had been the admiration of all. The Conference had been exceedingly fortunate in having such a President, and he hoped his successor would tread in the same lines and endeavour to emulate his virtues.

Mr. Atkins said he appreciated very highly the honour of being allowed to second this motion. This meeting had been a decided success, and he wished most emphatically to put his consciousness of that fact on record. Very much of that success was in the hands of the President. He had given them freely not only of his money, but of his time, which to a busy man in the full pressure of the zenith of his commercial life was of great importance, but it had been unstintingly given. He had given that which was better even than time or money—his thorough hearty co-operation. He (Mr. Atkins) had referred to his address on a former occasion, but there was not only the address which would be enrolled in the permanent literature of the Conference; besides that there was that unseen yet ever conscious magnetism of personal presence, that exquisite charm which only some men

possessed, and which they only showed when they threw their whole heart and intellect into the work in hand, and for which no other recognition was possible to be given by those who benefited by it than to warmly recognize the services thus rendered.

Mr. SCHACHT, as the oldest Vice-President after Mr. Groves, put the resolution, which he said he could not do without saying how personally gratified he had been to see his friend occupying the chair. He held the opinion, in common with several about him, that that position was distinctly one of honour, and no man in England more worthily deserved the honour than Mr. Benger. All the personal qualities, in addition to those intellectual ones with which he was so highly endowed, were strong in him, and he had proved all that was expected, a thoroughly genial and able President.

The motion was carried with acclamation.

The PRESIDENT assured the members that he appreciated most fully the generous sentiments expressed by the mover and seconder of the resolution, and also the cordial way in which it had been received. He accepted office last year with the most slender hopes that he should be able to discharge the duties at all satisfactorily, either to the members or to himself, but he did so with the full assurance that he could depend on their consideration and indulgence. Now, putting aside the little brief authority with which he was invested, and falling back into the ranks, he did so with the greatest thankfulness to those who in spite of his failings had made the Bath meeting successful. The contributors of papers had been already thanked, but they were scarcely less indebted to those who had taken part in the discussions, and to some smaller extent to those who had supported them by their presence. He could not conclude without mentioning two gentlemen by name to whom the Conference at large, and he himself personally, were very much indebted. There might be some present who hardly realized how much depended on the work of the two Secretaries, Dr. Thresh and Mr. Naylor. It was work which was not confined at all to the time of the meeting, but extended throughout the whole year, and he should be ashamed of himself if he failed to mention them in this manner.

RESUSCITATION OF THE LOCAL ASSOCIATION.

The PRESIDENT said that before sitting down he would say that after the last meeting of the Conference, twenty-five years ago, a local association was formed in Bath, which was supposed after some years of life to be dead, but it turned out to be only torpid. It seemed to have been in a trance, and the little noise which had been produced by this Conference had caused it to revive. They would all be glad to hear that steps had been taken by some local gentlemen which rendered it certain that a local association would be formed after they left, and he might go a step further and announce, with Mr. Atkins's permission, that he was coming to the first meeting to give them an address.

Mr. MERRIKEN said the revival of the Association was greatly due to the kind interference of Mr. Benger. He happened in course of conversation with him yesterday to mention the fact of there having been a local association formerly which was the outcome of the meeting of the Conference of 1864. The association was successfully carried on for some five or six years, during which the members were largely indebted to the efforts on their behalf of the late Mr. W. Stoddart, and Mr. Schacht also assisted. He did not know whether the gentlemen present had found that the air of Bath, especially at that time of the year, was rather enervating, but he himself, being a north countryman, when he first came there felt that enervating influence to a great extent, and possibly it also greatly influenced the existence of the old association. But the genial presence of the President of the year had tended very much to put a sort of tonic property into the air, which entirely overcame, he trusted, that enervating influence. When it was suggested that the Association was dead, he said, no, it only slept. Mr. Benger immediately seized the idea, and communicated with Mr. Atkins, who had kindly offered his services. If any other gentleman, in order to re-establish the Association and place it on a sound basis, would kindly render assistance it would be very gratefully received.

REPLY FROM THE AMERICAN PHARMACEUTICAL ASSOCIATION.

After the close of the Conference the following letter was received by Mr. F. B. Benger from the Permanent Secretary of the American Pharmaceutical Association:—

"Philadelphia, *September* 17, 1888.

"Mr. F. Baden Benger,

"President, British Pharmaceutical Conference,

"7, Exchange Street, Manchester.

"Dear Sir,—Your cablegram extending fraternal greetings from the British Pharmaceutical Conference to the American Pharmaceutical Association was received at Detroit on the morning of September 4, and the undersigned was directed to acknowledge the same with the hearty good wishes of this Association. Being under the impression that the Conference meeting at Bath had taken place during the last week in August, a reply by cable was not sent, and I now discharge the pleasant duty imposed upon me, with the assurance of the fraternal feelings of this Association. Our next annual meeting will take place in 1889, at a date to be announced hereafter, in the city of San Francisco, and I am sure to voice the sentiment of every member of our Association when I assure you of the great pleasure it would afford us to welcome you and other members of the Conference at this contemplated meeting on the shores of the Pacific Ocean.

"I have the honour to be, with great respect,

"Yours very truly,

"JOHN M. MAISCH,

"*Permanent Secretary American*

"*Pharmaceutical Association.*"

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The first general meeting of the twelfth session was held at 103, Great Russell Street, W.C., on October 11, Mr. E. J. Millard, President, in the chair.

The minutes of the annual general meeting having been read and confirmed, and several new members proposed, the President then delivered the

INAUGURAL ADDRESS.

BY E. J. MILLARD.

Gentlemen,—When your Executive did me the honour of electing me as your President for the ensuing year, I felt that the difficulties and objections were well nigh insurmountable. My short experience on your Council seemed to me to far outweigh the knowledge gained as a responsible officer of the Association, or even an ardent enthusiasm for its future welfare. But the unanimous vote of your Council overcame at last my objections, and, confidently relying upon your generous support and co-operation, I have undertaken the obligations and duties of the Presidency.

We inaugurate this evening the twelfth year of the existence of the Chemists' Assistants' Association. During those past years this Association has been building up, slowly and surely, a reputation for good which I am confident will never be shaken. We have

some reason to point with pardonable pride to the large number of papers annually read before this Association, which marks in the clearest manner our share in the efforts for the advancement of pharmacy.

Much has been accomplished since that small band met, under the parent wing of the Pharmaceutical Society, and called this Association into being. We are too apt to forget, in the face of carefully-prepared programmes and smoothly-running sessions, the difficulties that our predecessors had to meet and conquer. In fact, none but those who have access to the records of those early days can appreciate fully their labours. Without an abiding tabernacle, hindered and hampered by want of funds, regarded with something like suspicion, small wonder that the seedling, watered with prejudice, did not grow vigorously. My only surprise is that it existed, and nothing but the energy of its founders and freedom from internal dissension could have saved it. All this is changed *We* have the satisfaction of entering into their reward, of witnessing the gradual growth and sound financial basis of the Association, of appreciating the position that it has fairly won for itself in the pharmaceutical world.

Whilst referring to the early history of our body, my first thought is of the sad loss experienced by the early death of our first President, Philip Princep, which took place recently in Australia, where he had gone two years ago, owing to failing health. After his year of office, he was appointed Secretary to the British Pharmaceutical Conference, which position he filled for nearly six years, only resigning when compelled to seek a warmer clime. Although the records of this Association's early days are rather meagre, it is well known that he was imbued with an enthusiastic desire for the welfare of the organization he was so intimately concerned in starting. It must have been a source of keenest pleasure to him, to have seen the continued and increased success that has marked its progress during recent years. I am sure I may offer on behalf of the Council and members the sincerest expressions of deepest sympathy to his bereaved widow in the irreparable loss she has sustained.

The objects for which this Association was founded are well known to you, and the repetition of them here must be understood to be merely the annual enunciation of the cause of its existence. It was inaugurated a decade ago to promote good fellowship amongst assistant-pharmacists by social intercourse, and also to promote mutual development by providing an arena for the discussion of all matters connected with the welfare of our calling.

I propose, for a short time, to consider the value of this Association to its members, and to press its claims upon those who have not yet thrown in their lot with us.

No sort of question can be entertained that association for mutual welfare is eminently calculated to bring out the higher qualities of its members, whilst the two-fold object of improvement and recreation, embraced by our own Association, should yield the highest possible results.

The principal method by which mutual advancement is sought is by reading or hearing valuable papers of practical use in every-day pharmacy. It is a matter of regret that papers from our own members are not more easily and numerously forthcoming, no doubt due to the fact that considerable time and an infinity of experiments are necessary to produce eminently satisfactory papers. Some, I am aware, are of opinion that writing now-a-days is overdone. Overdone, I venture to think it can never be, if none are admitted but those who bring their *imprimatur* from sound knowledge and experience or from an earnest desire to benefit their fellow-men.

But research work is not a *sine quâ non* for the admission of papers before this Association. We all recognize the value of useful summaries and reports of recent investigations, brief notes of personal observation, in the daily routine, and even papers of purely literary origin. I earnestly urge upon each one of you the necessity of undertaking a share in this reproductive work. There is too much of that self-complacent lethargy which so often follows the passing of needful examinations, forgetful that a hard-earned diploma is merely the guarantee of capacity as a true scholar, henceforth to be judged by his fruits. For,

> "We bring forth weeds
> When our quick minds lie still."

In writing thus strongly I make no apology, for I am convinced that there are many amongst us who need only a little rousing to waken a noble spirit of emulation to utilize the dormant powers within. Reasons there are why talents may not appear, none why they may not exist: and talents untried are talents unknown.

Some are deterred, I fear, from an inherent sense of modesty, painfully aware that they have few opportunities to enable them to distinguish themselves. An old writer has said, "Another often sees in us what we see not ourselves, and may there not be that in us which is unseen by both." Moreover, the very effort to attain a higher standard of excellence than before is invigorating, and although our ideal may seem as far off as ever, yet we cannot fail to be improved by every honest effort in an upward direction.

Another matter which merits your active assistance is the increase of our numerical strength. Starting with a mere handful of members our numbers have steadily increased until those connected with the Association are little short of 200. And yet this feature is not altogether satisfactory when we remember that it represents, at a modest computation, barely one-fifth of the whole number of chemists' assistants in the metropolis. On the other hand, the maintenance of our numbers is fraught with considerable work and unwearying industry to a few. This is especially noticeable, when, owing to the migratory character of our members, it sometimes becomes necessary to enrol 50 or 60 new members to maintain even our former numbers.

I have not sufficient time at my disposal to attempt to arrive at the reason why the Association is not even better supported than it is. Two, reasons, however, occur to me, which by stating freely may, perhaps, have some effect.

1. *Many assistants are not sufficiently alive to the advantages offered by this Association.*

It cannot be the small subscription that deters the large number of outsiders from uniting themselves to us, for I can assure them that there is no other association that is able to offer so many and so varied advantages as we can. Besides the weekly meetings of an intellectual and practical character, we set apart an evening once a month for purely social and musical enjoyment. These evenings are so popular, and supply such a pleasant form of relaxation from business, that their frequency will, in all probability, have to be again increased. An annual Conversazione and Dinner are further attractions of the convivial type. Valuable prizes of £5, offered by Messrs. Burroughs, Wellcome and Co., and a silver medal awarded by the Council, are annually open for competition to the members. And lastly, the Council is enabled to present each member with a complete printed record of the proceedings and papers read at the meetings during the session. This volume should be invaluable for reference, and also for stimulating an interest in the Association and its useful work. It is, perhaps, advisable to acquaint members with the fact that each copy of our 'Proceedings' alone costs very nearly the amount of their subscriptions.

We live in a sadly material age, and this is my excuse for placing the attractions of this Association in the plain unvarnished style enumerated above. Your President last year in clear forceful style showed you the ethical advantages of association, chief amongst which is the development of that *esprit de corps* so necessary, and yet so sadly wanting, in our profession. I have attempted to reply to the "cui bono?" spirit from a more commercial point of view.

2. *That employers do not more generally support and encourage the Association in the manner they might do.*

It has been pointed out over and over again that the interests of the chemist and his assistant are identical. That which tends to raise the latter must inevitably react favourably upon the former. It should follow, therefore, that an association whose object is the improvement of *employés* deserves and should receive the warm support of employers. I am glad to say that this is the case with the principal pharmacists and firms in the metropolis; but there still remain large numbers who are, apparently, absolutely indifferent. To those I would appeal, that they should at least speak a good word for us and encourage their assistants, by all the means in their power, to partake of the advantages offered by the Association.

I am aware that at one time we were regarded with suspicion, and our motives were distrusted, but I sincerely hope we have outgrown all this. All our proceedings and discussions are reported, and dealing as they do with innumerable subjects, including the vexed question of pharmaceutical politics, yet not a discordant note or protest has been raised at the sentiments that have been freely expressed. I take it, therefore, that we may assume that the path we have chosen is parallel with that of our employers, which should further entitle us to their support.

The indifference and apathy that has been manifested must be largely due to imperfect acquaintance with the work of the Association. I would at least ask that this indifference should not lead them into criticism without due thought or to the careless occupation of the scorner's seat. I am sure I need not remind them that far more harm is done by criticism than by praise, and that it is unnatural to expect perfection in a young man's work. We must all pass through various stages of progress before that desirable end can be reached, and defects are often due, naturally and inevitably, to that transitionary period.

I must ask your indulgence while I deal shortly with the legislative work and other matters of interest attempted during the last year.

A feeling of considerable disappointment at the slow and painful progress of our Pharmacy Acts Amendment Bill has been felt and expressed by many among us. This, I believe, has been heightened by comparing the fairly rapid passage of the Irish Bill. It is some satisfaction that the authors and promoters of the English Bill are in no way responsible for this sluggish pace. We have to execrate the over-loaded legislative machinery which so successfully hampers all private Bills and the inexplicable attitude adopted by a reckless opposition. Though this Association is doubly pledged in favour of a definite course of training for pharmacists, some of us are inclined to look beyond the period when the chemist shall be duly educated as well as duly examined, and ask them for further acknowledgment in return. Whether the day will ever dawn when the position of pharmacy in England will compare equally to that of other European countries, I know not; but further protection at the present day is, I fear, outside the range of practical pharmaceutical politics. Nevertheless, I cannot help feeling that nothing would be more likely to quench the perennial internecine war and bind together the scattered members of our craft, than that the Council of the Pharmaceutical Society should attempt, at a favourable opportunity, to secure to the properly trained pharmacist the fruits of his study and examinational success.

Whilst our leading medical friends are united in their opinion that free trade in physic is not only inadvisable but actually dangerous, the history of pharmacy shows that only on occasions when the interests of the profession were inimically assailed, as in certain Poison Bills, or when great things were to be expected by their accord, as in the 1868 Pharmacy Act, have chemists been united and accomplished much. No other subject will be likely to attain this much desired unison, whilst once obtained its influence in Parliament and on public opinion should be irresistibly felt. "The strong man and the waterfall," says the old proverb, "channel their own path." May we not hope that the energetic leader of the Society to which we are proud to belong, may, with the help of his Council and supported by the vast body of qualified pharmacists, yet live to achieve this master-stroke in the history of pharmacy.

Most earnestly, however, do I agree with the doctrine which says, "Put not your sole trust in legislation." For, after all, success must rest mainly upon the individual according to his diligent self-culture and upright performance of duty, even should the surrounding circumstances be disadvantageous.

Moreover, the pharmacist from his scientific training is singularly adapted to protect himself and compel an acknowledgment of the honour due to him in his own calling. His education should raise him above the miserable and disheartening work of competing with the grocer and drysalter. The extension of his skill in chemical analysis or other branches of science would probably repay, whilst his ability to give a personal guarantee as to the purity of his wares should reap its own reward. This is what the *Pharmaceutical Journal* in its leaders has been urging for some years past; but all this in no way affects the justice of my previous contention.

Before leaving the consideration of the Pharmacy Bill I cannot help expressing the hope that when it comes up for final consideration some means may be found to place "open surgeries" and "doctors' shops" under the same restraint that will be enforced upon branch pharmacies. It is little short of scandalous that a medical man should think that because of his medical qualification he may open one of these curiosity shops, and place whomsoever he please—even his own housemaid, forsooth—in sole charge of it. Fortunately, the present law, as laid down by Sheriff Rutherfurd, is sufficient to partially cope with this anomaly, and to prevent the indiscriminate sale of poisons. It being important to note that the appeal against the Sheriff's decision in the Scotch case referred to was wisely dropped.

The crushing defeat of the Early Closing Bill by 183 votes must have attracted your attention and regret. The result of the division was not unexpected for some time before, and I fear there is little prospect of this decision being reversed in the present Parliament. I venture to think, however, that the debate which ensued in no way shook the arguments which have been advanced in favour of the measure. I am sorry that the promoters did not consider it advisable to insert the thin end of the wedge in the Local Government Act passed last session. It is my firm belief that had they attempted the insertion of a clause compelling all shops to be closed at an early hour at least one day in a week, where the majority of the tradesmen were in favour of such a plan, they would have been successful. We are all aware of repeated instances where arrangements for early closing were voluntarily made, but the outstanding of one or two avaricious souls to the general proposal has been suffi-

cient to defeat the majority and militate sorely against the interests of assistants. Had such a clause been carried, its advantages to future legislation would have been enormous, for the principal plea of opponents was that there should be no legislative interference with private liberty. From correspondence that I had at the time with Sir John Lubbock and some of the opposers of his Bill, I feel tolerably certain that had such a clause as I have indicated been introduced it would have been accepted, and the first blow struck at the long hours system. Unfortunately the promoters of the Early Closing Bill have adopted the position of the Bill, the whole Bill, and nothing but the Bill.

A matter which caused considerable satisfaction to qualified assistants as a class, was the prompt action of the Secretary of the Pharmaceutical Society in connection with the Lewisham poisoning case. You will remember the melancholy result of an astounding error made by a young man who was stated in the press to have passed his examination and to be duly qualified. This was at once corrected by the Secretary, who pointed out that the sole examination passed by this unfortunately distinguished gentleman was the Preliminary. I need hardly point out how prejudicial to our interests such damaging statements are, about chemists and assistants being qualified, which the lay press so carelessly publish. Apparently on the loose principles stated to be adopted at some "stores," where, in reply to the question if their assistants are qualified? the answer is given in the affirmative, with the mental reservation, "but not by examination."

I would join in the wish that has been expressed, that a scheme could be devised by which everyone who obtained the diploma of the Pharmaceutical Society would be henceforth connected with it. From a close acquaintance with a large number of students, I am confident that at that period of their life, when they are intensely interested in the educating and examining work of the Society, they have the warmest admiration for it. Their acquaintance with the splendid museum, with its unique collection of drugs and chemicals, and the perfect library, rich with scientific literature, although only extending, perhaps, for a few months, is quite sufficient to account for this enthusiasm. Of course there are instances when a poor misguided individual who has been unable to impress an examiner with a sense of the brilliancy of his attainments, resolves into bitterness of spirit. The majority, however, I am firmly convinced, are moved in quite a different manner, and if they could be attached to the Society at that period would become loyal adherents, reaping good themselves and adding to the numerical strength and unanimity which is so desirable. As it is, many drift into either indifference or open revolt, both fatal to any project requiring the unanimous support of the profession.

Another suggestion receives my most cordial support. That is, the creation of a Fellowship in pharmacy. The main idea has been that the Major examination should open the door to this degree. I would prefer that it should be the reward of a thesis on an original practical pharmaceutical investigation, and that it should be attainable after the passing of the Major examination.

I have endeavoured in these remarks upon pharmaceutical politics to confine myself strictly to those matters which affect the present and future interests of assistants.

And now, gentlemen, I must turn to the consideration of the arrangements for the ensuing session.

First, I am sure I may convey your warm thanks to the Committee which so promptly issued the 'Proceedings' of last session. This work, by no means light, has been cheerfully performed in an indefatigable manner, and reflects great credit upon the members of that Committee. The volume has grown to quite bulky proportions, and is one quite worthy of the size and importance of our Association. The Council is glad to be again able to present each member of that session with a copy free of charge. It is earnestly hoped that new members will avail themselves of the opportunity of obtaining this valuable record of our proceedings and of the papers read at our meetings at half the published price. Members of last session are also entitled to receive extra copies at the same price, and it will be found that the judicious lending of these copies to fellow assistants will awaken interest in the Association and secure many new members.

Your Council has determined to retain Thursday as the day of meeting. The alteration last year from Wednesday to Thursday was partially an experiment although not attempted without much care and deliberation. That it was successful was shown by the increased average attendance, and only two complaints out of the large number of members were received. Thursday, moreover, is gradually becoming the early closing evening, and so there would appear even more likelihood of its being the off night for assistants.

I trust that every pharmaceutical employer will help in procuring this evening to his assistant, whilst the hour at which we meet will allow of their coming from all parts of the metropolis.

The Burroughs-Wellcome Prize (to which has been generously added a copy of Remington's splendid work, 'The Practice of Pharmacy,') and the Association's silver medal, are again offered for competition this December. The award having been made last year should encourage many members to compete for these valuable prizes. Great latitude is given in the choice of subject, so as to enable members to work at that to which they have given most attention. The vast field of chemical research is open; surely there will be no hesitation to explore therein. And it must be remembered that original work counts of highest value, and rightly so. Time, energy and perseverance will be necessary factors; but you will be more than repaid, for you will have the satisfaction of extending the republic of science, of bringing fresh gold to the mint. You will have contributed your share to that "ultimate end of knowledge by employing the Divine gift of reason to the use and benefit of mankind."

The marked success that attended our institution of an evening devoted to short papers, when no less than thirteen communications were made, has caused your Council to again set apart an evening for this purpose. Many of us must come across dispensing difficulties, impurities in drugs or make botanical notes, etc., which hardly warrant an elaborate paper, yet are of sufficient interest to be brought forward on such an evening. These notes, whether great or small, are often very valuable, and as stimulating the faculty of observation should be warmly encouraged.

In conclusion, I must impress upon every member the necessity of each doing his utmost to advance the cause of the Association. Having once identified yourself with this body it becomes your duty, as an integral portion, to uphold it by every means in your power. Your attendance is desired at the meetings, then unselfishly yield it; your help is needed in discussions, then willingly render it; your talents owe something to your fellow members, liquidate that debt at your earliest opportunity.

It is related of Michael Angelo, that when finding fault with the narrow idea and scope of a pupil's work, he wrote across it the word, *Amplius*. So I would write across the work of the Association, *Amplius*, and would commend this extension of its area of usefulness as a consummation to be devoutly wished for. If there be healthy cohesion, practical unanimity and accelerated energy, then will the Association grow as—

> The thoughts of men are widened
> With the process of the suns,"

and with growth will come greater perfection in its work and increased good and prosperity to its members.

At the conclusion of the address,

Mr. M. Carteighe, President of the Pharmaceutical Society, in proposing a vote of thanks for Mr. Millard's eloquent and practical address, said it covered such a wide field that it would be difficult and dangerous for him to take it in detail. The freedom with which their President had entered into trade politics was not given to him. He had to deal with somewhat older, more advanced men, at least in years, and they had to be considered somewhat tenderly when any new projects were brought forward. Referring to the address as evidently coming from the heart, Mr. Carteighe said that in his experience he had found a lack of what he ventured to call pharmaceutical "backbone." At any rate there was no lack of it as far as their President was concerned, and this might be said equally of their eleven former Presidents. He congratulated the Association and its President on the success which had hitherto attended their career, and was inclined to think Mr. Millard's views of their numerical progress as a little pessimistic. Principals, unfortunately, did not take so much interest in the Association as they might, and therefore they must not expect much enthusiasm from their assistants. The work of pushing the machine along was left to workers, whose numbers must be necessarily few, and it was no wonder, therefore, that the Association's numerical strength did not rapidly increase. He thought assistants did not fully realize that it was their positive duty to associate with their fellows, to help to rub each other's angles down. Apprentices were generally associated with only one or two colleagues; they had few opportunities to compare themselves with others of their own standing, to measure themselves by these, and so find their own level. One of the great features of the Association was the training it gave its members in discussion; they were able to practice on each other and thus overcome difficulties due to diffidence and hesitation, and learn to speak on the subject of any paper fairly well. Passing to the consideration of the political matters alluded to in the address—education and training and the possibility of further powers being obtained for protecting those who hah been properly trained in pharmacy—he asked them to be chary in expecting that in this country, with all its free institutions, much would be done in protecting any one class, except for the benefit of the public. Whether it would be possible to obtain some more definite recognition in the future or not, it was possible for them to do much for themselves. He then sketched the constitution of the Institute of Civil Engineers. That was a body which, though possessing, it was true, a Charter, had yet no protection. By law anyone could be a civil engineer; yet so perfect was the organization of the Institute and so strong the *esprit de corps* that prevailed amongst its members, for the good of themselves, that it was practically impossible for anyone to practice successfully, in England, as an engineer, without the support of the Institute. Again, there were the Inns of Court. They were bodies possessing a voluntary examination, members who were voluntarily subordinate to their self-constituted authority, and yet by their loyalty to their Inns, and to each other, for the good of the Bar, they made it impossible for anyone not recognized to practise with success as a barrister. The medical profession, also, for practical purposes, was not protected. He might point to the manufacturing towns where, as they knew, the illegitimate practice of medicine went on enormously. What was wanted in regard to pharmacy was not protection, but union. If all pharmacists would unite for the good of the cause, they wanted no help from the Legislature. They must remember that in 1868 a large number of men became registered who were not strictly chemists and druggists; many of the class who came in then were traders who thought by making a shot at pharmacy to realise a fortune. Many of these still remained, and no doubt this was very annoying to young men; but they were getting well-trained, educated men in the ranks now, and must wait patiently until the others had disappeared. In other countries pharmacy was carried on by pharmacists alone, but here by doctors also, and they must not forget that the latter had an undoubted right to do this. For they existed first, and pharmacists had in a manner supplanted them. But he believed that most medical men did not care to practise pharmacy, any more than pharmacists liked to see them do it. The English public, however, has long been accustomed to expect advice and medicine together. On the continent pharmacy and medicine began together among fairly well educated men, but here the medicine man worked upwards from the "medicine woman." Englishmen, too, were accustomed to consider illness as a weakness and disgrace, which no doubt had something to do with the lack of interest shown by the public in medical and pharmaceutical affairs. Progress must be essentially slow, and if the Pharmaceutical Society was thought to be unduly so, they must not forget that it had much to contend with.

Mr. Joseph Ince said that the address they had just listened to had one natural sequence, a vote of thanks. He would say, of the Association, that he wished political work was carried on in the same spirit and manner as the work of the Association. He had to congratulate the members in two things, the presidents, past and present, and the Council, and he sincerely wished them a continuance of prosperity. He had had considerable experience in societies, and had always found it easy to begin one, but that they always got weaker by degrees, and members soon began to lose their interest. He thought the reason why they so often failed was because after a time the work was left in the hands of a few, and members ceased to realize the meaning of the word association. He would counsel the members of the Association not to be afraid of attempting papers because they thought they must be original, and on some great subject. It was not necessary to be possessed of great scientific knowledge in order to produce papers of real pharmaceutical interest, and he recommended the younger members of the Association not to be afraid of attempting small things. They were all familiar with the story of Giotto, who when asked to give a specimen of his skill drew with one sweep of his hand a circle. On being told that it was such a little thing, he replied that that might be so, but it was perfect. So he would say of their Association, that though small, as far as it went it was perfect, and it was by utilizing small things that great objects were attained. In conclusion, he begged to second, with very great pleasure, Mr. Carteighe's vote of thanks to Mr. Millard for his valuable address.

Mr. T. S. Dymond thought it well that not only patrons but one of their own members should show their approval of the Presidential address. Mr. Millard had touched with tact upon all the points raised, and if he did not agree with him upon all these points entirely, still he was glad to hear Mr. Millard use outspoken language. In conclusion, he asked the members to give Mr. Millard their support, as they had done to himself in the previous session, and begged cordially to support the vote of thanks.

Mr. Carteighe then put the motion, which was carried with loud applause.

The President thanked Mr. Carteighe, Mr. Ince and Mr. Dymond for the very kind manner in which they had proposed and supported the vote of thanks, and also the members for the way in which they had re-

ceived it. He thought the Association was to be congratulated upon obtaining such a clear exposition of the policy of the parent Society from such a high authority. He particularly urged that any expressions of opinion, which he had thought fit to insert in the address, must be regarded as his own, and in no way pledging the Association. In some matters, he was quite unable to gauge the opinion of even a majority of the members, so those opinions must rest entirely on their own merits. He cordially thanked the eminent pharmacists present for their kindness and interest in the Association, and warmly welcomed both old and new members.

The proceedings then terminated.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fifth general meeting of the thirty-ninth session was held at the Royal Institution on Thursday evening, October 11.

The President, Mr. A. H. Samuel, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations announced:—'The Annual Report of the Liverpool Geological Society' for 1887-88, from the Society; 'Proceedings of the Liverpool Naturalists' Field Club' for 1887, from the club; 'The Twenty-fourth Annual Report of the Alumni Association of Philadelphia' from the Association; 'Ephemeris,' vol. iii., no. 3, from Dr. Squibb; 'The Twenty-fourth Annual Report on Alkali, etc., Works,' from Mr. W. A. E. Fletcher; 'Annual Report of the Smithsonian Institution,' 1885, part ii.; 'Bulletin of the Chemical Society of Washington,' Nos. 1, 2 and 3, from the Society; the *Pharmaceutical Journal*, from the Society; and the *British and Colonial Druggist*, from the publishers.

A vote of thanks having been accorded to the respective donors, the following gentlemen were elected members of the Association, viz., Mr. Anthony S. Buck and Mr. T. S. Wokes.

The President now called upon Mr. H. B. Thornton, F.C.S., to read his—

Note on Oxide of Zinc.

BY H. BELCHER THORNTON, F.C.S.

I was led to an investigation of the matter which forms the subject of this paper from two considerations: first, because in my capacity of demonstrator of practical chemistry in the Liverpool School of Pharmacy I have found that the pupils when analysing what was supposed to be oxide of zinc have invariably reported it as carbonate; and second, because the chief process ordered by the British Pharmacopœia, supposing large quantities of material to be acted upon, is, in the writer's opinion, calculated to produce an oxide not entirely free from the carbonate. The results of analysis of a number of samples obtained from various sources seem to confirm this opinion.

The sample which the Liverpool students had returned as carbonate was subsequently submitted to a preliminary analysis in order to determine the accuracy or otherwise of their working. Upon the addition of nitric acid a distinct effervescence was set up. A larger quantity of the substance was taken to which acid was added, and the evolved gas was passed into lime water, where the carbon dioxide was precipitated as carbonate of calcium, proving conclusively that CO_2 was evolved. Some of the gas was decanted into a test-tube and its presence further confirmed by its action upon a burning match. The behaviour of this sample of supposed oxide of zinc was contrary to the description of it in the British Pharmacopœia, where it distinctly states that the substance "dissolves *without effervescence* in dilute nitric acid."

This being a question affecting pharmacy and pharmacists was deemed worthy of the attention of a Society like yours having for one of its objects the discussion of matters bearing upon pharmaceutical affairs.

It was therefore decided to investigate a number of samples with the object of finding (1) whether the carbonate was a usual or an unusual impurity, (2) to estimate the amount of carbonate present, and (3) to see if the specimens conformed in other respects to the description given of them in the British Pharmacopœia.

There is not much that is historical connected with our subject. Its origin dates back over a century; and its discovery was made by one Hellot in the year 1735.

Various processes of manufacture have been adopted from time to time, although, as you are aware, there is a native oxide of zinc to be found in America, which is, however, rendered impure by the presence in it of oxides of manganese and iron. The manufacture, according to the "London College," was to be carried out as follows:—Sulphate of zinc and sesquicarbonate of ammonia were to be dissolved in separate quantities of distilled water, the solutions strained and mixed. The resulting precipitate was to be washed frequently with water, and finally burnt for two hours in a strong fire. A similarity of idea prevailed in the method adopted by the Edinburgh College. In both cases double decomposition took place, a portion of carbonic acid escaped and hydrated carbonate of zinc and sulphate of ammonia remained, the former precipitated, the latter in solution. The carbonate was decomposed by subsequent ignition and the oxide remained. The Dublin College directed the oxide to be made from the metal zinc and obtained by sublimation, "the whitest part of the sublimed powder being reserved for use."

The British Pharmacopœia of to-day makes mention of two processes being somewhat similar in style of treatment as those previously mentioned. In the preparation from the carbonate some idea is given as to when the process ceases, for, says our authority, "expose it to a dull red heat until a portion taken from the centre of the contents of the crucible and cooled no longer effervesces when moistened with water and dropped into dilute sulphuric acid."

The second method, as officially stated, is "oxide of zinc may also be obtained from metallic zinc by combustion." Both processes have their drawbacks, as if hurriedly prepared by incineration of the carbonate the product is liable to consist of a mixture of oxide and carbonate; and if prepared by combustion minute particles of metal zinc may contaminate the result as regards the purity of this substance.

In an edition of Pereira's 'Materia Medica and Therapeutics,' dated 1842, we find this statement: "The substance met with in shops under the name of oxide of zinc is in reality a carbonate of this metal, and therefore effervesces on the addition of an acid." In a more recent work, entitled 'Commentary on the British Pharmacopœia,' and written by Walter G. Smith, M.D., published in 1875, we find an observation therein as follows, "Commercial specimens are often impure from faulty preparation and contain undecomposed carbonates and other basic salts of zinc." The literature on the subject does not seem to be very extensive, but these two quotations are taken in support of my views.

The first step in conducting the analysis was to find some reliable means for estimating the carbonate present. Two or three different methods were tried, and those furnishing the most concordant results adopted.

The decomposition of the carbonate present by nitric acid in a mixture of the sample with a little water, gently warming the solution, passing the gas through a drying tube to absorb any moisture present, and

conducting the carbon dioxide into potash bulbs, was first tried. Weighing the potash bulbs with absorbed gas separately served to check the result. It was found, however, that the results were as equally consistent when the potash bulbs were not employed, and only the loss estimated, and this modified form was subsequently adopted.

Another process suggested by Mr. Ward seemed also to yield fairly consistent results. This was to heat the sample in a hot air oven at about 105° centigrade until a constant weight was obtained. The sample was then ignited, removed to a dessicator and weighed when cold. This presupposes that the molecule of water present in the carbonate ($ZnCO_3(Zn2HO)_2 \cdot H_2O$) is driven off at the former temperature. Processes requiring special apparatus were not attempted, as the analysis would be sufficiently accurate for our purpose by the use of the means previously specified.

Each sample was submitted to at least two analyses at different times and by different methods, and the mean of these observations is here stated. The sample yielding such a remarkable percentage of carbonate was four times analysed by the writer and once by a friend independently, and we differed in our results only by a low decimal figure.

Tabulated Results of Analysis.

Sample.	No. of estimates.	Mean of oxide taken.	Mean of CO_2 evolved.	Mean of CO_2 per cent.	Mean percentage of $(ZnCO_3,(Zn2HO)_2,H_2O$
A . .	5	·943	·02575	2·7285	21·145
B . .	3	·86225	·017	1·9735	15·2945
C . .	2	·993	·016	1·6115	12·489
D . .	2	1·152	·01675	1·454	11·2565
E . .	2	1·354	·01125	·831	6·4295
F . .	3	1·7585	·01075	·831	4·7305

From the results of these analyses we may conclude that the oxide of zinc as generally met with in commerce *does* contain an appreciable quantity of carbonate.

As to the general character of oxide of zinc the British Pharmacopœia states: A soft, nearly white tasteless powder, becoming pale yellow when heated. Dissolved in nitric acid it should form a solution which is not affected by chloride of barium, nitrate of silver or diluted sulphuric acid, and give with carbonate of ammonia a white precipitate which dissolves entirely without colour in an excess of the reagent, forming a solution which is precipitated white by sulphydrate of ammonium.

The samples under discussion presented a uniformly consistent adhesion to the observations of the British Pharmacopœia as regards their general characters. They were all soft, nearly white, tasteless, odourless powders, turning yellow when heated.

A solution in nitric acid to which chloride of barium was added showed traces of sulphates in samples A, C, and E. Nitrate of silver produced a slight cloudiness in samples B, C, and D. All the samples were unaffected by diluted sulphuric acid, and reacted as described in the B.P., with carbonate and sulphydrate of ammonium.

In conclusion, I would venture to express an opinion that the oxide—more especially if exposed either in a damp state or in a moist atmosphere—is capable of absorbing some of the carbonic acid present in the air. This view seems somewhat strengthened by the following incident:—This opinion was mentioned to a friend, who stated that in his cellar there had been a sample of oxide of zinc belonging to a former occupant of the shop for many years with the cork loosely fitting the bottle. Some of this was brought to me, and a quantitative analysis revealed the fact that a large proportion of carbonate was present. This power to absorb carbonic acid gas from the atmosphere is probably the cause of the reminder in the British Pharmacopœia that the oxide after preparation is to be transferred "to stoppered bottles."

At the close, Mr. A. C. Abraham in proposing a vote of thanks to Mr. Thornton for his paper, said that he was not surprised to find that oxide of zinc frequently contained appreciable quantities of carbonate; he had himself, some time ago, tested a sample of what was advertised as a specially pure article, and found that it contained a large proportion of carbonate. He was, however, somewhat surprised to find that none of the samples tested were pure.

Mr. M. Conroy said he had much pleasure in seconding the vote of thanks to Mr. Thornton. He had himself tested very many samples of oxide of zinc, and in almost every case found them practically free from carbonate. He had, however, always tested the samples direct from the manufacturers, and was inclined to think that they must subsequently absorb CO_2, as suggested by Mr. Thornton.

The discussion was continued by Mr. J. S. Ward, who said he thought it far more likely that the carbonate present was the result of absorption of CO_2 by an originally pure oxide than that it was a consequence of incomplete ignition by the manufacturer. He said he had frequently observed the presence of carbonate in magnesia, and felt convinced that in this case the presence of CO_2 must be brought about by absorption, as he believed that this article was usually very carefully prepared.

The President, in supporting the vote of thanks, said they were much indebted to Mr. Thornton for his paper, which was an interesting and practical one, and had given rise to a good discussion.

Mr. Thornton having replied to the discussion,

The President announced that the next business was the election of a President for 1889, whereupon Mr. T. F. Abraham rose to propose that Mr. A. H. Samuel be re-elected President for the ensuing year, and in a few well-chosen words spoke of the high appreciation in which Mr. Samuel was held by all the members of the Association, and of the ability with which he has filled the chair during the present session.

The motion was seconded by Mr. M. Conroy and carried unanimously.

Mr. Samuel heartily thanked the meeting for the honour conferred upon him, and the meeting terminated.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

This Association held its opening meeting for the session on Wednesday, October 10, in the rooms of the Chemical Club, Victoria Hotel, Mr. W. Wilkinson, the Vice-President, in the chair.

The reports of the Secretaries (Mr. W. Elborne and Mr. H. Wilson) and of the Treasurer (Mr. G. S. Woolley) showed the Association to be in a satisfactory condition financially and otherwise. In the Secretary's report it was stated that weekly copies of the *Pharmaceutical Journal* had been received, and that the Council were indebted to the British Pharmaceutical Conference for a copy of the 'Year-Book of Pharmacy.'

Mr. Hart moved the adoption of the reports, which was seconded by Mr. Bowden, and agreed to.

On the motion of Mr. Lane, seconded by Mr. Harold Woolley, the officers of the Association were re-elected as follows:—President, Mr. W. S. Brown; Vice-Presidents, Mr. W. Wilkinson and Mr. F. B. Benger; Treasurer, Mr. G. S. Woolley; Secretaries, Mr. W. Elborne and Mr. H. Wilson; Honorary Librarian, Mr. H. Wilson; Auditor, Mr. G. Wilkinson. These gentlemen, together with the following members, form the Council:—Messrs. Boor, Botham, Bowden, Hart, Robinson, Midgeley, Stones, Slack, Westmacott, H. Woolley, and Kemp.

It was decided to continue the monthly meetings on the second Wednesday of each month during the winter in the rooms of the Chemical Club.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The Annual Dinner.

The Annual Dinner of this Society was held at the Freemasons' Hall, in the evening of the 10th inst., after the proceedings in connection with the School of Pharmacy, Mr. E. Radley Learoyd, the President, occupying the chair, and being supported by a large assemblage of local pharmacists and members of allied professions.

The President, after dinner, proposed the usual loyal toasts.

Dr. Symes next proposed the toast of "The Sheffield Pharmaceutical and Chemical Society." He thought all pharmacists, assistants and apprentices in Sheffield should belong to it, as numerical strength was better than mere pecuniary strength. Sheffield men, true as steel, were doing good work, and outsiders would look towards Sheffield in its good work, and follow the example. He coupled with the toast the name of Mr. Radley Learoyd.

Mr. Learoyd was much pleased to find that Dr. Symes appreciated what had been done in Sheffield. It seemed plain that Sheffield had now attained a position of honour in matters pharmaceutical. After the hard times of old time druggists, modern students should be grateful for their present advantages. They could not possibly conceive the hardships of students in the past. With reference to grievances of the trade, let them not forget their culture and status, and continue to do their duty to their fellow men. He was very much obliged to Dr. Symes for his toast.

Mr. Allen, the borough analyst, rose to propose the toast of the "Pharmaceutical Society of Great Britain," coupled with the names of Mr. Newsholme and Mr. Ward. Though an outsider, he read all he came across concerning the Society, and had many friends in its ranks. He admired its objects of education, mutual help, and was glad to find that local schools were assisted, as this acted as a preventive of undue centralization. Local societies contributing to its funds largely had a right to such assistance, and he was glad to find there was a prospect of regular payments to provincial schools, with which he had great sympathy.

Mr. Newsholme said the Council had spent much money, and he thought it was well spent. Concerning the matter of chief interest, he thought the Council was quite willing to assist the provinces, but the provinces must first help the Society.

Mr. Ward supported Mr. Newsholme. He referred to the many occasions upon which he had spoken to this toast and to the past experience of the local Society. The source of weakness had been lack of unity. If pharmacists were unanimous they would occupy a better position in every way. Every local pharmacist should join the Society. With greater influence pharmacists might get an honest living. This was now difficult.

Mr. Cubley proposed "Success to the Sheffield School of Pharmacy." He spoke of efforts in the same direction made twenty years ago, which commenced with great enthusiasm but failed. The present attempt was more likely to succeed if it avoided the faults of the old one. The Pharmaceutical Society had helped the school well, but, like Oliver Twist, the school should ask for more. Passing from the topic in hand, Mr. Cubley expressed the opinion that the Minor fee should be made to cover life membership of the Pharmaceutical Society. Concluding, he wished all success to the school. It had good lecturers, intelligent students, and a sympathetic Council, and he had little doubt of its ultimate success.

Mr. Grierson was glad that Mr. Cubley thought the coming year would be successful. But yet he doubted if it was altogether likely to prove so financially. The Pharmaceutical Society had helped the school well, and now it was time to initiate self-help. The students' fees, however, would not suffice to cover expenses, and he considered that local pharmacists who felt that education was needed should themselves contribute. The Pharmaceutical Society no doubt ought to help, but the local pharmacists should help more.

Mr. Wootton rose to propose the toast of "The President and Council of the Sheffield Pharmaceutical and Chemical Society." He echoed Dr. Symes's remarks on the influential position of the Society. The toast was coupled with the name of Mr. Fox, the senior Vice-President. He was pleased to have been asked to come to Sheffield. Anyhow, he would have come, for it was well worth the journey from London any day to hear Dr. Symes.

Mr. Fox responded. Speaking for the Council he felt the chief object of the local Society should be to foster the School of Pharmacy. He referred to Mr. Cubley's suggestion, and doubted the feasibility of his project.

Mr. Maxey then proposed "The Visitors," and spoke of the pleasure he experienced in seeing them present.

Dr. Morton thanked those present for their kind reception. He congratulated Sheffield upon possessing the Pharmaceutical and Chemical Society, and expressed his conviction of the great public value of pharmacists. He thought medical men should leave compounding to other and abler hands.

Mr. Frank Harrison echoed Dr. Morton's remarks, and congratulated the Society upon its school. He also expressed his admiration of the whole system of organization.

Obituary.

Notice has been received of the death of the following:—

On the 9th of September, Mr. William Honey Hayward, Chemist and Druggist, Fore Street, Trowbridge. Aged 53 years.

On the 2nd of October, Mr. John Fewtrell, Chemist and Druggist, Main Street, Turiff, Aberdeenshire. Aged 42 years.

On the 5th of October, Mr. Francis Hirst, for many years with Mr. Hairsine, Haymarket, London. Aged 37 years.

On the 8th of October, suddenly, Mr. Henry Roberts Cornish, Pharmaceutical Chemist, Penzance. Mr. Cornish, who retired from business a few years back, had been a Member of the Pharmaceutical Society since 1845, and for a considerable time filled the office of Local Secretary.

On the 11th of October, Mr. Thomas Ritson, Pharmaceutical Chemist, High Street East, Sunderland. Aged 67 years. Mr. Ritson was one of the Founders of the Pharmaceutical Society.

On the 12th of October, Mr. George Longley, Chemist and Druggist, Glossop. Aged 58 years.

On the 12th of October, Mr. Frederick Kent Morrell, Chemist and Druggist, Kennington Park Road, London. Aged 45 years. Mr. Morrell was an Associate in Business of the Pharmaceutical Society.

BOOKS RECEIVED.

The Analysts' Laboratory Companion. By Alfred E. Johnson, F.I.C., F.C.S., etc. London: J. and A. Churchill. 1888. From the Publishers.

Handy Book of Medicine Stamp Duty, with the Statutes and Appendices. By E. N. Alpe. London: Office of the *Chemist and Druggist*. From the Publishers.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Poisons Regulations.

Sir,—As this subject is again to be brought up, I shall be glad if you will grant me space to lay before your readers a series of resolutions passed at a meeting of the Manchester Chemists and Druggists' Association on March 4, 1870.

The Sub-Committee appointed at the February (1870) meeting then presented the following resolution, which had been unanimously adopted by the Council on February 21:—

"That, in the opinion of this Council, legislation as to the keeping and dispensing of poisons is unnecessary and undesirable; a well-digested plan, if issued by the Council of the Pharmaceutical Society as a recommendation, would be generally accepted, and meet all present requirements."

Copies of this resolution had been forwarded to nearly all the chemists' associations in the north of England, and the unanimous opinion received had been in favour of its adoption.

It was then resolved by the meeting that the above resolution be forwarded to the Pharmaceutical Council, accompanied by a letter enumerating the reasons for its adoption, the chief of which were the following:—

"That accidents arising from mistakes in dispensing are not sufficiently numerous to call for legislative interference."

"That legislation would be inoperative unless accompanied by systematic inspection, which would be very objectionable."

"That medical men, in whose hands the greater part of the dispensing remains, would be unaffected by the proposed regulations."

"That if the penalty now attaching to want of due care, involving as it does not only pecuniary responsibility for damage, but ruinous loss of reputation, does not induce sufficient care, no legislative restriction would avail with the negligent, whilst the trade at large would be hampered and annoyed by unnecessary regulations."

These, although not covering the whole ground, will serve to refresh the memories of our older members, and perhaps induce our younger brethren to look up the history of the question.

When Dr. Symes has delivered himself, and made known the course he proposes should be adopted, I trust that the members of the Society and of the trade generally will make free use of your columns to give publicity to their opinions.

Manchester. G. S. Woolley.

Sir,—It is with feelings of regret I see there is a chance of "poison regulations" being sprung on the trade again. The hatchet of discord has now been buried eighteen years or more, and it is a pity to exhume it till the generation of pharmacists who then contended against an imperfect "poison regulation" being foisted on the trade has passed away.

In the absence of any statistics of a crushing nature I hope the trade in their own interest will withstand to a man "poison regulations" from without, and trust to the growing intelligence of each individual (as tested by examination after an education in accordance with a curriculum) to conduct the business of his own shop according to the requirements of his own trade, instead of submitting to any "grandmotherly" interference, in fact, "shop rule" over his own shop.

I much regret that one with so clear a head as Dr. Symes is moving in this matter; but it proves that even the hardest head, as well as the strongest armour, has a soft place somewhere.

The subject seems to have been revived by the numerous cases of poisoning by carbolic acid, with which the pharmacist has had little to do.

The cases of poisoning by carbolic acid seem to arise, for the most part, from its being supplied by "Boards of Works" in any bottle or jar or cup without a label. The acid is also obtained from stores and oil shops without labels.

It seems to me the case might be met by making carbolic acid a poison within the meaning of the act.

London, S.W. W. W. Urwick.

Assistants on the Riviera.

Sir,—Mr. Groves declines to argue further the comparative merits of assistants, English and German; I have, therefore, no right to criticize his criticisms on my letter. Permit me to carry my arguments away beyond assistants.

The more capable a man is as an assistant the more successful he becomes as a master. All the leading pharmacies on the continent where international business is conducted belong to Englishmen. If the German assistant be superior to his English rival, the fitness of things is strangely warped in this particular, for employers have been assistants.

Not that I ever expect to be more than

An Assistant on the Riviera.

Vermin Killer.

Sir,—For the information of Mr. T. W. Robson and others interested, the substance referred to in my former note was a pure native sulphate of baryta, free from any carbonate. It is not easy to explain its action, and it would be interesting to know its effect on larger animals. It has an injurious effect on dogs.

F. M. Rimmington.

Vermin Killer and Acetum Ipecacuanhæ.

Sir,—Permit me to comment on two matters which are noticed in a recent issue. First, the use of native sulphate of baryta as a vermin killer. I have long used the carbonate of barium for this purpose—according to Pereira it is more active than the sulphate—and though not to be compared with strychnine, arsenic and other common vermin poisons, my experience is that it is sufficiently effectual for its comparative safety to compensate the loss of potency in relation to the deadlier poisons.

The other point, with respect to which my experience may be useful to others, is the exhaustion of ipecac by percolation with an acetous menstruum. I find, after many various methods have been tried, that practical exhaustion of the root may be obtained, as well as a free passage of the menstruum through the marc, if, after the powdered root has been digested with the acetic acid twenty-four hours, an equal quantity of water is added, and another twenty-four hours' digestion allowed before transferring to the percolator. The effect of this is that the vegetable tissues expand before, instead of after, they are packed.

There is a practical gain, too, as 1 ounce of root is exhausted for all ordinary purposes, when 10 ounces of percolate has been collected.

W. G. G.

J. A. Wheldon.—(1) *Didymodon rubellus.* (2) *Bartramia pomiformis*, var. *crispa.* (3) *Hypnum rutabulum.* (4) *Anomodon viticulosus.* (5) *Eucalypta streptocarpa.*

R. E. V. John.—We are unable to find your name on the Register.

Whisky.—We are informed that the ocular demonstration consists in the exhibition of the violet dye produced from the methylic alcohol in the methylated spirit, a product of the oxidation of methyl-aniline being probably meant. See *Pharm. Journal*, [3], v. 1006.

Dispenser.—The 'Art of Dispensing' is published at 42, Cannon Street, or may be had through most of the principal wholesale houses; price 3*s.* 6*d.*

Communications, Letters, etc., have been received from Messrs. Perry, Alcock, Whelpton, Assistant, Inquirer, Iconoclast.

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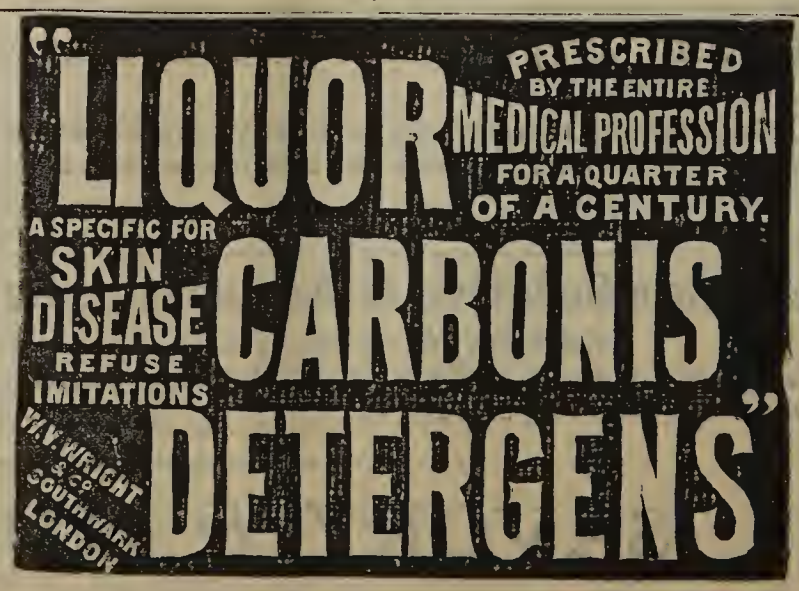

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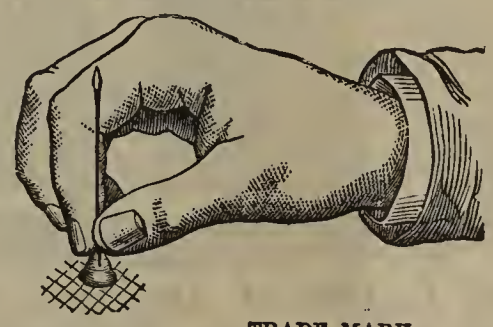

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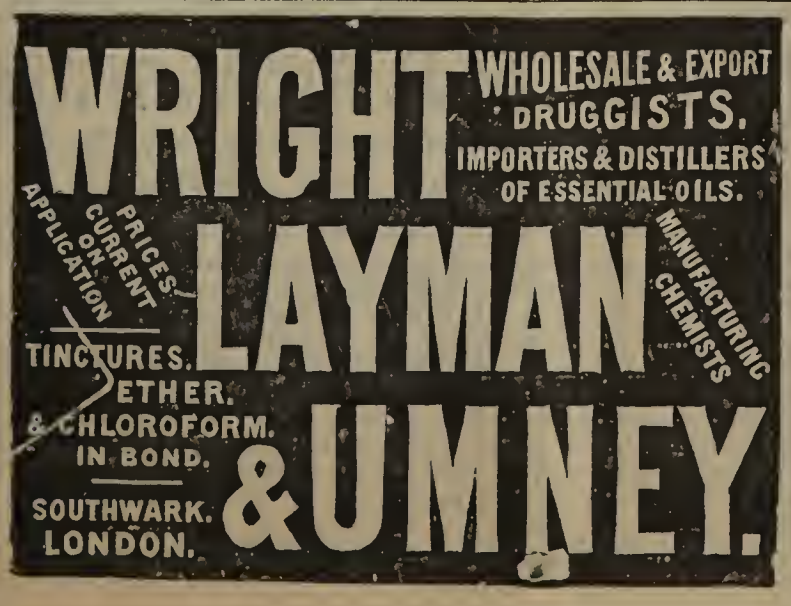

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5. KENT	„	660.	„	52.	„	400
6. SUNDERLAND ...	„	500.	„	50.	„	400
7. KENT	„	1000.	„	45.	„	750
8. BIRMINGHAM ...	„	500.	„	38.	„	300
9. BIRKENHEAD ...	„	750.	„	60.	„	250
10. STAFFORDSHIRE	„	1200.	„	60.	„	1150
11. LIVERPOOL ...	„	900.	„	50.	„	600
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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 957.] SATURDAY, OCTOBER 27, 1888. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.
RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

17, BLOOMSBURY SQUARE, LONDON.

An EVENING MEETING of the Society will be held at the Society's House, 17, Bloomsbury Square, London, on Wednesday, November 14th, at half-past Seven.

The chair will be taken at Eight *precisely*.

The following Papers will be read:—

"Tartar Emetic valuation."

"The Purity of commercial specimens of Tartar Emetic."

By Professor DUNSTAN and Miss BOOLE.

"Note on Ancient Materia Medica."

By E. M. HOLMES.

"The Pharmacology of the Nitrites of the Paraffin series." By Professor W. R. DUNSTAN.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, November 7th, as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society, of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of THREE ANNUITANTS on the Benevolent Fund of this Society will take place on Thursday, the 6th day of December next, at 12 o'clock precisely.

RICHARD BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 3rd, 1888.

For List of Approved Candidates, see Journal, October 20, page ii.

There are at present *forty-nine* annuitants, receiving £1670 per annum, and casual relief is also granted, amounting in 1887 to nearly £500. The total expenditure in 1887 was £2375.

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Ten Guineas.. .. .. TEN Votes for life.
And to increase in the same proportion.

Should any Subscriber or Donor, or the widow of any Subscriber or Donor, become a Candidate for an annuity, such number of votes shall be placed to his or her credit, at the first succeeding election, as shall be represented by the whole amount of subscriptions or donations to the Benevolent Fund he or she (or in the case of a widow, her husband) may have contributed.

Donations and Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to RICHARD BREMRIDGE.

THE CHEMISTS' BALL.

A MEETING will be held, by permission, at 17, Bloomsbury Square, on Monday evening, November 5th, 1888, at 9 p.m., for the purpose of making preliminary arrangements for the ensuing Ball. Any gentleman desirous of becoming a Steward, and unable to be present, will oblige by informing the Honorary Secretary without delay if such is his intention.

13, Curzon Street, Mayfair, W. John William Bowen, *Honorary Secretary.*

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WINTER SEASON, 1888-9.

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THE "SANITAS" COMPANY, Limited, Letchford's Buildings, Bethnal Green, London.

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"EMP. HŒMOSTATICUS"

Antiseptic. (REGISTERED.) Styptic.

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Maker of Porous Plasters, Adhesive, Belladonna, Mustard, Corn, Court, and all other Plasters. Maker to the British Government.

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Do. Do. DOUBLE DISTILLED 18/9

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ALL THE NEWEST PROPRIETARIES

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MOST RECENT PRICES.

SENT POST FREE ON RECEIPT OF BUSINESS CARD.

INSPECT OUR WELL-ASSORTED STOCK

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DRUGGISTS' SUNDRIES, PERFUMERY, LOZENGES, MINERAL WATERS, &c.

Prices compare favourably with others

Agencies of all kinds undertaken on favourable terms.

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(BLOCK TIN.)

3½ pints, per dozen, **20/-** ; 5 pints, per dozen, **25/-** ; 7 pints, per dozen, **31/6** ; 10 per cent. and 5 per cent. One Month.

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WOULD DO WELL TO WRITE FOR

SAMPLE 5-OZ. BOTTLE OF

PIERRE DAVID'S EXTRACTS.

All the leading odours at 10*s.* per 20-oz. bottle.

ALSO

PIERRE DAVID'S PERFUMES,

In round stoppered bottles, at 13*s.* and 22*s.* per doz.

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A varied assortment of Crystal and other Smelling and Toilet Bottles always in Stock.

Write for Sample Dozen (all different patterns), for 5s. or 7s. 6d., subject to same discount.

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KEARSLEY'S Widow Welch's FEMALE PILLS

These are universally acknowledged to be the Genuine, and Druggists may safely recommend them.

CAUTION !

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Price 27s. per Dozen, subject to usual Discount.

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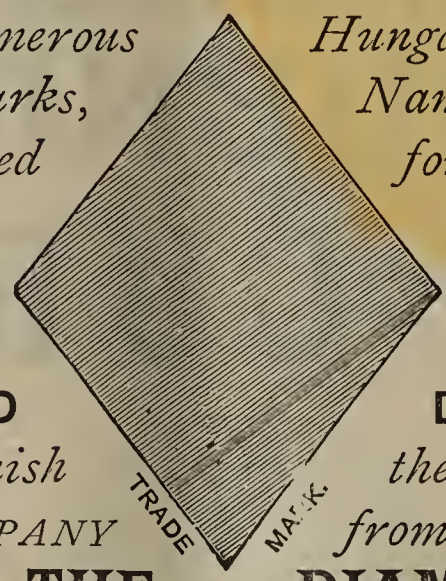

DEMAND THE DIAMOND MARK,

and insist upon receiving the HUNGARIAN APERIENT WATER of the APOLLINARIS COMPANY, LIMITED, London.

Of all Druggists and Mineral Water Dealers.

LOFTHOUSE & SALTMER,

Manufacturing Chemists, Wholesale & Export Drug Merchants,

HULL.

Manufacturers of all Pharmaceutical Preparations on the best and most improved principles.

QUOTATIONS ON APPLICATION.

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1 part to 5 Sp. Vini Rect. 56 O.P. makes Sp. Æth. Nit. 850.

This concentrated preparation is carefully drawn in our own laboratory, is highly recommended, and is daily finding increased favour with the trade for making Sp. Nitre, as required for use, and thus avoiding the risk of a development of free acid, which is more or less prevalent in Sp. Nitre that has been drawn some time.

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BOUDAULT'S PEPSINE.

The Paris Hospitals have used no other.

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Medicinal Gelatine Capsules.

			Containing	30	36	48
Cascara Sagrada (5 mins.), in round boxes...	per doz.	7/-	In oval screw-cap bottles	—	—	—
Castor Oil, in square boxes	„	5/-	Do. do.	5/6	—	8/-
Cod Liver Oil, in square boxes	„	7/-	Do. do.	—	8/-	—
Copaiba, without Name, in oval boxes ...	„	4/9	Do. do.	5/6	—	8/-
Copaiba, with or without Name, best, in oval boxes	„	5/9	Do. do.	6/6	—	9/-
Copaiba, Flexible, in oval boxes	„	6/-	Do. do.	6/9	—	9/6
Copaiba, Flexible, larger, in oval boxes ...	„	8/-	Do. do.	—	10/-	—
Copaiba and Cubeb, in square boxes ...	„	9/-	Do. do.	—	11/-	—
Copaiba, Cubeb, and Buchu, in oval boxes ...	„	8/-	Do. do.	—	10/-	—
Copaiba, Cubeb, and Sandal-wood Oil, Flexible, in oval boxes.	„	17/-	Do. do.	17/-	—	25/
Oil of Male Fern (18 drops), in square boxes	„	17/-	Do. do.	—	18/-	—
Sandal-wood Oil, Flexible, English, in round boxes	„	26/-	Do. do.	—	30/-	—
Sandal-wood Oil, Flexible, Foreign, in round boxes	„	20/-	Do. do.	—	23/-	—
Tar, Norwegian, in square boxes	„	6/-	Do. do.	—	7/-	—
Terebene, pure (10 drops), in round boxes...	„	12/-	Do. do.	13/-	—	20/
Turpentine, in square boxes	„	6/-	Do. do.	—	7/-	—

SPECIAL QUOTATIONS TO WHOLESALE BUYERS.

S. MAW, SON & THOMPSON, LONDON.

MAW'S MENTHOL CONES.

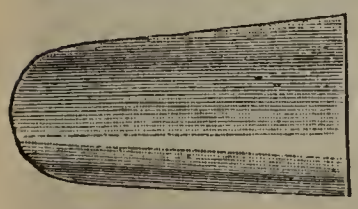


Fig. 5.

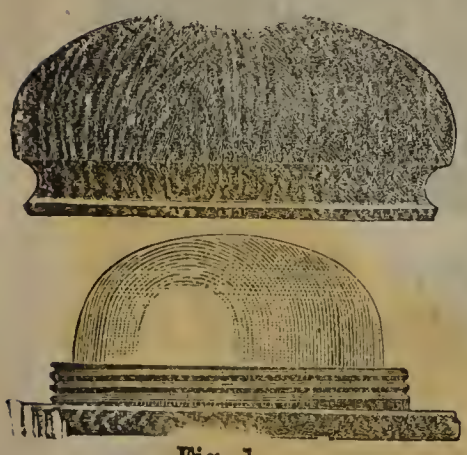


Fig. 1.

Fig. 3.

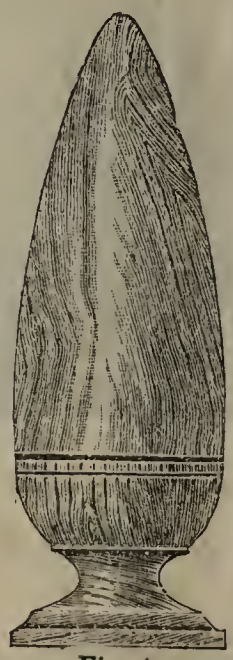
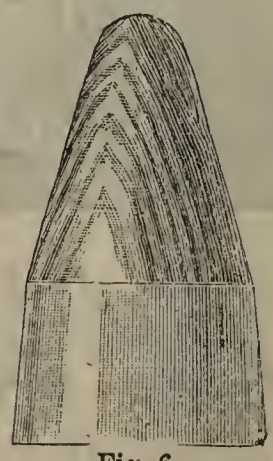


Fig. 4.



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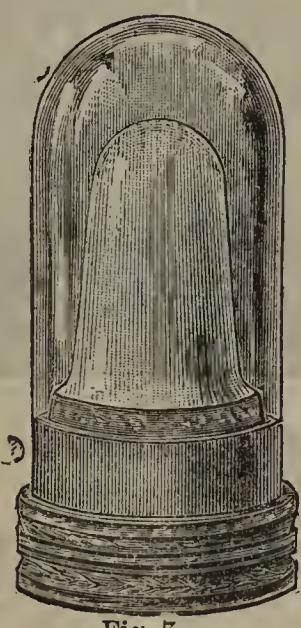

Fig. 7.

Fig. 8.

Fig. 1.	In Ebony Cases, flat for the pocket	per doz. 6/-
	In Boxwood Cases, per doz., 3/- and 4/-; in Vegetable Ivory	„ 6/-
Fig. 3 & 4.	In Boxwood Cases, per doz., 2/8 and 4/-; in Vegetable Ivory	„ 4/- and 6/-
Fig. 5.	In White Opaque Glass Jars, with Red Celluloid Caps	„ 2/6 and 3/6
	Mounted, in Stoppered Bottles	„ 6/6
Fig. 6.	Mounted on Vegetable Ivory, in Glass Bottles, Screw Metal Caps	„ 4/6
Fig. 7.	On Boxwood Mounts, Glass Covers	„ 3/6 and 5/9
	On New Glass Mounts, Glass Covers	„ 3/6, 4/,- 5/6, 8/-
Fig. 8.	On Glass Mounts with Glass Covers	„ 4/6 and 6/-

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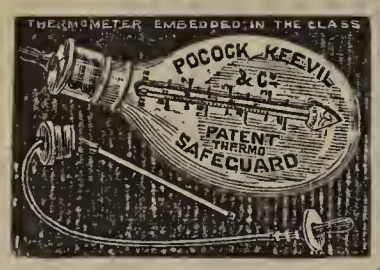

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No. 3, Superior quality, with both kinds of fittings, 2s. 6d.

All are fitted with pure black rubber fittings, or without tubing, as the Boat-shaped Bottle.

OF ALL THE WHOLESALE HOUSES, OR FROM

POCOCK, KEEVIL & CO.

72 & 74, WANDSWORTH ROAD, S.W. *Show Cards forwarded on application.*

VAN HOUTEN'S COCOA.

EASILY DIGESTED—PURE—SOLUBLE—MADE INSTANTLY.

Incomparably THE BEST AND MOST ECONOMICAL.

Being very strong & nutritious THIS Cocoa is cheaper & more satisfying than tea.

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SAMPLE TINS GRATIS { through your grocer or chemist.

The Chemists' Aërated & Mineral Waters Association. Limited

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The Chemists' true friend, established in 1878 to supply Chemists only with the highest quality of Aërated Waters at the lowest co-operative prices.

Received with doubt, it worked its way uphill to success, and now fills more syphons than any maker in the United Kingdom.

Number of Members about 2000. Last dividend 7½ per cent.

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London, 1862.

Howards & Sons

Gold Medal,
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1884.

Paris, 1855.

Paris, 1867.

City Mills, Stratford, Eſſex.

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PEPTONES
OF
BEEF,
MUTTON,
VEAL,
AND
CHICKEN.

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(REGISTERED)

A NOURISHING MEAT AND MALT WINE COMPOUND.

A stimulating tonic nutrient. Dose—¼ to 2 ounces twice daily.

In Bottles, 2s. 6d., 5s., and 7s. 6d.

Of all Chemists and Wine Merchants, and the Manufacturers,

HOOPER & COMPY., Chemists, &c.,

55, GROSVENOR ST., and 26, DAVIES ST., W.; also at 7, PALL MALL EAST, LONDON, S.W

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PUMILINE

The only Pure Essence and Extract of Snow-grown Pumilio Pines.

FOR GOUT, RHEUMATISM, BRONCHITIS, SORE THROATS, AND CHEST AFFECTIONS.

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Sir MORELL MACKENZIE wrote, December 9, 1887.

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LONDON.] [1888.

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MARGOSA OIL.

BY C. J. H. WARDEN,

Chemical Examiner to the Bengal Government.

Margosa oil is the oil extracted from the almonds of the *Melia Azadirachta*, natural order, Meliaceæ, a tree common in India, and known under the name of "Nim." The bark, leaves, fruit, and oil are held in high esteem by native and many European practitioners as remedial agents of value, a tincture and a decoction of the bark and a poultice of the fresh leaves being officinal in the Pharmacopœia of India. Preparations of the bark are considered effectual as antiperiodics, chiefly in the milder forms of periodical fever, and as tonics in convalescence after febrile and inflammatory affections.* The poultice of "nim" leaves is a common domestic remedy with natives, and is used as a stimulant application to indolent and ill-conditioned ulcers. The oil is used as an external application in rheumatism and as an anthelmintic, and is reported by Dr. A. Hunter to be an insecticide.†

Margosa bark was examined by Cornish in 1857,‡ who isolated an alkaloid, which he described under the name of "margosin." The later researches of Broughton,§ however, indicate that Cornish's bitter alkaloid is probably an amorphous resin. From the bitter oil of the seeds Cornish extracted an acid which he termed "margosic acid," but which he doubted to be capable of affording crystallizable salts.‖ Lepine,¶ who examined the oil, found it to have a specific gravity of ·921, and he describes it as possessing a bitter taste and a garlic-like odour, to congeal at +7° C., and to yield by saponification 35 per cent. of fatty acids, melting at 30° C., and 65 per cent., melting at 44° C. Subsequent writers on Indian materia medica have quoted Lepine's results, but as far as I am aware no additions to Lepine's results have been published.

The margosa oil used in the investigation described in this communication was obtained by expression in my laboratory; there can therefore be no doubt regarding the genuineness of the sample. The fruit was washed to separate pulp, the stones dried, cracked, and the almonds exposed to a gentle heat for some time to remove moisture. The dried almonds were then crushed, placed in a cloth bag, and the oil expressed. It was found very necessary to first dry the almonds before subjecting them to pressure; without adopting this precaution a white creamy fluid was obtained, instead of clear oil, from which it was subsequently impossible to separate the oil, except by ether or other solvent.

The oil thus obtained was filtered through filter paper before it was examined. Directly after filtration the oil, when viewed in bulk, had a slight greenish coloration by transmitted light, owing to some of the almonds not having been quite ripe, and to solution of traces of chlorophyll in the oil. Viewed in a thin stratum the colour of the oil was yellowish. The oil possessed a powerful garlic-like odour, and was very bitter. The specific gravity at 15·5° C. was 9235; at about 10°–7° C. the oil congeals, without losing its transparency. After standing for about thirty-six hours the recently expressed oil deposited a white sediment, which examined microscopically was found to be amorphous.

The colour reactions of margosa oil were not characteristic. With concentrated sulphuric acid a rich brown colour was yielded, and a strong garlic odour evolved. By Massie's test with nitric acid the oil became almost immediately of a reddish colour; after standing about one hour and thirty minutes the colour was pale yellow. The elaidin reaction conducted according to Pontet's directions yielded a solid firm yellowish product after eighteen hours, the temperature in the laboratory varying between 89° and 93° F. Exposed in a thin layer on a glass plate to a temperature of 100° C. for some days the oil did not dry or become tacky. The oil was easily soluble in ether, chloroform, carbon bisulphide, benzole, etc. Absolute alcohol agitated with it was coloured greenish; on separating the alcohol, and evaporating off the spirit, an extract was obtained which consisted of oil, from which a small residue, whitish in colour, separated on standing. The alcoholic extract was very bitter, and possessed in a marked degree the peculiar odour of the oil. The whitish residue deposited from the oil, separated by alcohol and examined microscopically, did not appear crystalline. Margosa oil after repeated agitation with alcohol was found to have lost its bitterness and almost wholly its alliaceous odour.

A known weight of the oil was saponified with alcoholic potash, the alcohol completely evaporated off, and the soap dissolved in water. On agitating the aqueous solution of the soap with ether, 1·60 per cent. of ether extract was obtained of an orange-yellow colour and bitter. This extract treated with 60 per cent. alcohol, left a small amount of white residue, which had the character of a wax. The aqueous solution of the soap, after separation of the ether, was heated for some time to remove dissolved ether, the solution was then mixed with dilute sulphuric acid in excess, and the insoluble separated from the soluble fatty acids in the manner recommended by Allen.* The soluble fatty acids amounted to 3·519 per cent., the insoluble to 89·128 per cent. The volatile acids consisted of butyric and a trace of valeric acid. During the distillation to separate the fluid from the volatile fatty acids, a small amount of a snow white fatty acid passed over; this acid had a melting point of 43·6° C., which corresponds with the fusing point of lauric acid. A weighed portion of the insoluble fatty acids, from which the lauric acid had not been separated, was dissolved in alcohol, and titrated with normal standard soda, using phenolphthalein as an indicator, ·288 gram of the acids required 1 c.c. of caustic soda for neutralization. No attempt at separating the fixed fatty acids was made; they probably consisted of a mixture of stearic and oleic acids, with a small amount of lauric acid.

Examined by Reichert's distillation process, 2·5 grams of the oil gave a distillate which after separation of the lauric acid, which had distilled over, required 4·6 c.c. of decinormal soda for

* Appendix to Pharmacopœia of India.
† *Ibid.*
‡ 'Indian Annals of Medical Science,' iv., p. 104.
§ *Pharm. Journ.*, June 14, 1873.
‖ 'Pharmacographia.'
¶ Gmelin's 'Handbook of Chemistry,' vol. xvii., p. 94.

* 'Commercial Organic Analysis.'

neutralization, phenolphthalein being used as an indicator.

The saponification equivalent of the oil was determined by Koettstorfer's method, and was equal to 284, the percentage of caustic potash required to saponify the oil being 19·72.

A preliminary examination of the oil having indicated the presence of sulphur, a quantitative estimation of the amount present was made and found equal to ·427 per cent. The oil after repeated agitation with alcohol was found to contain only ·109 per cent. of sulphur.

The extract obtained by agitating the oil with absolute alcohol has already been referred to; it was examined in the following manner:—The oily extract was treated with 60 per cent. spirit, allowed to stand, and the clear yellow alcoholic solution decanted from the insoluble oil; the alcoholic solution thus obtained was evaporated to dryness, mixed with ammonia, and agitated with ether. The ether solution was marked A. The aqueous solution, after separation of the ether, was mixed with dilute hydrochloric acid, and again agitated with ether. The ether separated of a yellow colour, and below it some flocks of a dirty yellow hue, which refused to dissolve after prolonged agitation. The ether solution was marked B. From the aqueous solution the insoluble flocks were separated by filtration and marked C. The filtrate was not further examined.

Examination of ether solution A.—The solution was agitated with dilute hydrochloric acid, to remove any principles of an alkaloidal nature. The ether was then separated and evaporated; the resulting extract was pale amber in colour, viscid at first, very bitter, and had a marked odour of the oil. It contained sulphur. It was easily soluble in 60 per cent. alcohol, ether, chloroform, etc., but insoluble in acids, or in caustic alkaline solutions. It had the properties of a neutral resin.

The hydrochloric acid solution was of a yellow colour; it was mixed with ammonia, which occasioned a white precipitate, and agitated with ether. The ethereal solution on evaporation left a yellow residue, not readily soluble in dilute acids. The dilute sulphuric acid solution was bitter, and yielded a precipitate with alkaline carbonates and hydrates, phosphomolybdic, and picric acids, potassio-mercuric iodide, chloride of gold and perchloride of platinum. This principle had therefore the properties of an alkaloid.

Ether solution B.—On evaporating the ether solution B, a dark reddish bitter extract was obtained, soluble in alkaline solutions, and re-precipitated in yellowish flocks by dilute acids. It had the properties of an acid resin.

Precipitate C.—The precipitate was well washed, and dissolved in alcohol; on evaporation a brittle darkish residue was obtained, soluble in alkaline solutions, reprecipitated in yellowish flocks by acids, soluble with very great difficulty in ether, easily soluble in chloroform. This principle thus also had the properties of an acid resin.

In addition to the principles above described as being present in the oil, an examination of the cake left after expression of the oil, indicated the presence of another neutral principle, insoluble in ether or alkaline solutions, but dissolving in chloroform.

Medical College, Calcutta.

NOTES ON ESSENTIAL OILS FROM MESSRS. SCHIMMEL'S REPORT.

Angelica Oil.—A parcel of angelica root has been received from Japan, though too recently to allow of a report upon the essential oil distilled from it. Eight species of *Angelica* are known to occur in Japan, but the exact botanical origin of the present consignment is not yet ascertained.

Arnica Flowers Oil.—It is stated that 100 kilos of fresh arnica flowers yield only about 40 grams of essential oil.

Arnica Root Oil.—In order to afford pharmacists an opportunity of examining this oil more closely, Messrs. Schimmel have distilled a quantity of fresh arnica root and have at their disposal about a kilogram of the pure essential oil, which they are willing to supply at cost price for the purpose of scientific investigation.

Bay Oil.—In respect to this oil, the demand for which is said to be still increasing, Messrs. Schimmel confirm from their experience the statements made recently as to the incorrectness of the description of its specific gravity and solubility, as given in the United States Pharmacopœia. Oil distilled in their New York factory from imported leaves had a specific gravity of 0·9828 at 15° C.

Betel Leaves Oil.—Samples of this oil have been supplied with a view to experiments being made as to its therapeutic properties.

Calamus Oil.—A sample parcel of calamus roots has been received from Japan, the oil distilled from which will be described in the next report.

Camphor Oil.—The "light camphor oil," being the portion of the crude oil boiling at about 175° C., is said to be now in regular demand for various technical industries. Recently it has found practical use in the soap manufacture, it having the property of covering the penetrating disagreeable odour of ordinary kinds of fat and tallow, and also the acrid odour of bone fat extracted by means of benzene. For this purpose the light camphor oil may be mixed with the fat before or after saponification, about 2 or 3 kilos being required for 100 kilos of soap. It is also said to be used by varnish makers, sometimes alone and sometimes mixed with turpentine oil. In a previous report the opinion was expressed that "light camphor oil" contained terpineol, but although this is still thought probable that body has not yet been isolated; on the other hand it has been found to contain from 5 to 6 per cent. of cineol (eucalyptol).

Cananga Oil.—Messrs. Schimmel refer to a second, low-priced, variety of Indian cananga oil, as being suitable as a perfume for soaps, but devoid of the finer fragrance that characterizes the prime quality Indian cananga oil, and, in a greater degree, the ylang-ylang oil.

Eucalyptus Oil.—It will be remembered that in previous reports Messrs. Schimmel have controverted the presence of eucalyptol in the oil distilled from *Eucalyptus amygdalina*, the source of most of the eucalyptus oil received from Australia, but that recently Herr Gildemeister reported that by a more delicate reaction he had obtained that body from amygdalina oil (see before, Sept. 1, p. 164). Referring to this subject, Messrs. Schimmel quote from a published statement by Mr. Staiger, the Brisbane chemist, a passage to the effect that in Australia it frequently happens that in the distillation of eucalyptus oil, the leaves of both species, *E. Globulus* and *E. amygdalina*, are placed in the still, from which is inferred the possibility of considerable variation in commercial oil of *E. amygdalina*. Consequently, the opinion is expressed that the question as to the presence of eucalyptol will not have been definitely settled until an examination has been made of a sample of pure oil specially distilled from *E. amygdalina* leaves, and this investigation the firm proposes to undertake. Messrs. Schimmel state thet they them-

selves have recognized the presence of eucalyptol in commercial amygdalina oil, but that the quantity is too small and the process too difficult to pay for its separation. The "so-called eucalyptol from *E. amygdalina*, which by this time may be looked upon as practically killed," obtained by fractional distillation over caustic potash, is said to consist principally of phellandren, $C_{10}H_{16}$ (eucalypten), and about 20 per cent. of eucalyptol, $C_{10}H_{18}O$. Such a preparation has a specific gravity of 0·890, is strongly laevogyre, and does not solidify in a freezing mixture. It can be easily identified by mixing 1 c.c. of the oil with 2 c.c. of glacial acetic acid, and adding to the mixture 1 to 2 c.c. of a concentrated aqueous solution of sodium nitrite, when a gentle shaking causes almost instant solidification to a crystalline paste of phellandren nitrite. Neither pure eucalyptol nor oil of *E. Globulus* gives this reaction, both remaining unaltered, or at most becoming somewhat darker in colour.

Larger consignments have now been received from Australia of the leaves of *Eucalyptus maculata*, var. *citriodora*, *Backhousia citriodora* and *E. Staigeriana*, which have been distilled. The oil obtained from the leaves of *E. maculata*, var. *citriodora*, is described as corresponding in its characters with the sample mentioned in the April report (see *Pharm. Journ.*, vol. xviii., p. 908). The principal constituent of the oil is a ketone (? aldehyd), which gives with acid sulphites of the alkalies a difficultly soluble compound. It boils under slight decomposition between 205° and 210° C., and is identical with the ketone (aldehyd) occurring in citronelle oil, which according to Kremers has the composition $C_7H_{14}O$, though the analyses made by Messrs. Schimmel correspond more closely to $C_7H_{12}O$. About a kilogram of this body, which it is proposed to call "citronellon," is available for investigation. The oil from the leaves of *Backhousia citriodora* corresponds also with those attributed to it in a previous report (loc. cit.). The aldehyd or ketone-like body there spoken of as its principal constituent has been more closely examined. It has a composition represented by the formula $C_{10}H_{16}O$, boils at 220°–227° C., undergoes decomposition in distillation, and easily resinifies. This body, which has been named "citral," possesses an intense lemon odour and has been found also in small quantity in lemon oil and lemon grass oil, while it constitutes 30 per cent. of oil distilled from "citronelle fruit."

Ginger Oil.—The use of ginger oil is said to show a considerable falling off, the spirituous extract of the rhizome being preferred for liqueurs. The specially prepared ginger from China referred to in a previous report (see vol. xviii., p. 888) has also proved unsuitable and much too dear for the liqueur manufacture.

Kesso Root Oil.—A first consignment of Kesso root, or Japanese valerian root (*Patrinia scabiosæfolia*), has been received, and the oil distilled from it is now available.

Lavender Oil.—Messrs. Schimmel criticize some published descriptions of lavender oil and give the following as the character of what they would consider to be a genuine sample. Specific gravity: 0·895 at 15° C., 0·890 at 20° C. Solubility: 1 part in 8 parts of alcohol, sp. gr. 0·864. Distillation: Out of 100 c.c. below 160° C. none passes over; from 185°–190°, 6·5 c.c.; from 190° to 250°, 785 c.c.; total below 250° C., 85 c.c.

Cochlearia Oil.—Messrs Schimmel express the opinion that a genuine distillate of scurvy grass (*Cochlearia officinalis*) is not to be met with in commerce, and say that it could only be produced at enormous cost, since the fresh herb only contains ¼–½ per 1000 of essential oil. A mixture of oil of rue with some mustard oil is sold under the name in Germany, which has not the slightest resemblance to the genuine article. Scurvy-grass oil contains as its principal constituent, according to Hofmann, a fraction boiling at 161°–165° C., sp. gr. 0·944, which he has recognized as isobutyl mustard oil and prepared synthetically. Experiments made by Messrs. Schimmel, however, to obtain in this way an artificial scurvy-grass oil have been fruitless, since although the commercial isobutylsulphocyanate has a certain resemblance to the genuine distillate, it cannot be used as a substitute on account of a highly objectionable odour accompanying it.

Sumbul Oil.—Referring to the difficulty in obtaining supplies of sumbul root for the distillation of this oil, the report states that this drug is not now to be met with in Russia. Formerly it was brought by merchants from Buchara, Turkestan, to the fair at Nischnei-Novgorod, but for some years past, on account of the absence of demand for it, the supply there has ceased.

Rosemary Oil.—The following are given as the characters of an undoubtedly pure Italian oil of rosemary, obtained first hand:—Specific gravity: 0·905 at 15° C., 0·900 at 20° C. Solubility: 1 part in 12 parts of alcohol, sp. gr. 0·864, as a maximum, showing already a trace of turbidity. Distillation: Out of 100 c.c. there passes over up to 170° C., 4·5 c.c.; from 170°–200° C., 84 c.c.: total up to 200° C., 88·5 c.c.

Mustard Oil.—In correction of some statements that have been made recently as to the amount of sulphuretted oil obtainable from certain cruciferous seeds, Messrs. Schimmel say that the maximum quantity of oil yielded by *Brassica nigra* (Dutch mustard) is 0·90 per cent., and by *Sinapis juncea* (Russian mustard), 0·52 per cent.

Storax Oil.—The residue after the distillation of the oil from *Styrax liquida* is said to be practically odourless.

Wintergreen Oil.—Mention is made that recently samples of wintergreen oil from Java have been received and some doubt is expressed as to its botanical origin. [It may be mentioned that seventeen years ago Dr. Vrij stated in this Journal (vol. ii., p. 503) that probably wintergreen oil could be distilled profitably in Java from the leaves of *Gaultheria punctata*.]

Ylang-Ylang Oil.—According to information received from Manila, the differences in quality of the numerous varieties of this oil met with in commerce depend principally upon the method of preparation and the selection of blossoms, as these possess the finest aroma when freshly picked. In the distillation the first, most volatile, portion of the oil has an incomparably fine perfume, whilst that distilling over afterwards gradually manifests a stale odour; the finest oil is therefore sent out by those firms that distil only the first portion. In practice if 100 kilos of fresh flowers would yield 1200 grams of oil, the finest aroma would be concentrated in the first 600 grams that passed over.

Dilem Leaves Oil.—From Java a sample of "dilem leaves" has been received, possessing a very fine perfume and yielding about 1 per cent. of an ethereal oil that in odour is said to resemble patchouli oil, but to smell essentially fresher, finer, and less musty. It is a yellowish-green, moderately thick liquid, has a specific gravity of 0·960 and boils between 250° and 300° C. It is considered that if the cost of producing this oil should prove to be not too great it might take an important place in perfumery, and steps are therefore being taken to determine the origin of the leaves and obtain a supply,

Massoy Bark Oil.—A large supply of massoy bark having been secured through the agency of the German New Guinea Company, an appeal is made to the patriotism of German perfumers and soap makers to find an application for the first product of this kind from a German colony. The oil is described as having an agreeable aromatic odour resembling cloves and nutmeg, and as being suitable as a perfume for cheap toilet soaps. The plant from which the bark is derived was discovered by D'Albertis in south New Guinea and named by Beccari *Massoia aromatica*. Gmelin, who

attributes the bark to *Cinnamomum Kiamis*, Nees, gives in his 'Handbuch' (iv. 356) the constituents of the oil as follows: (1) an almost colourless thin light oil, with an odour of sassafras; (2) a thick, heavy, less volatile oil, with a weaker odour, but tasting strongly like sassafras; and (3) massoy camphor, a white powder, heavier than water, less soft to the touch than fatty substances, odourless and almost tasteless, allied to laurin and caryophyllin and soluble in hot alcohol and in ether. In preliminary experiments Messrs. Schimmel have obtained from the bark about 7 per cent. of an oil having a specific gravity of 1·04, boiling between 200° and 300° C., and containing about 75 per cent of eugenol. The portion of the oil insoluble in soda liquor boiled between 210° and 245° C., and among other bodies contained safrol.

Matsu Oil.—The Japanese oil mentioned under this name in a former report, and supposed to have been a distillate from a birch or beech tar, has now been ascertained to have been derived from a tar of either *Pinus Massoniana* or *P. densiflora*, both of which trees pass under the name "matsu" in Japan. The former is said to show great similarity to *Pinus austriaca* and the latter to *P. sylvestris*.

Citronelle Fruit Oil.—A larger consignment of the small round berries of the size of a pea, designated "citronelle fruit," has been received from Java, and has yielded about 3½ per cent. of essential oil. This oil resembles verbena oil, and is unusually powerful and rich; its specific gravity is 0·980 and it boils from 180° to 240° C. It contains a terpene and citral (see under Eucalyptus oil). In the Indies it is known under the name "minjak sereh" and is credited with being a panacea.

East Indian Oils.—Messrs. Schimmel also report upon fifteen samples of essential oil received from India, only one of which was found to be a pure distillate. This was described as "*lemon oil*" and had a fine lemon and melissa odour, essentially finer than that of citronelle oil, and at a moderate price would probably prove acceptable. The others were all mixtures having a basis of sandal wood oil, and were all condemned as useless.

From St. Domingo samples of oils have been received under the following names:—

Bergamot Oil.—A distilled yellow oil with a powerful and fine aroma, resembling oil of petit grain in odour, but not recalling bergamot oil. Probably the distillate of the leaves and unripe fruit of some species of *Citrus*.

Lavender Oil.—A water-clear essential oil, quite different from the European varieties of lavender oil, and rather recalling spike oil in odour.

Rosemary Oil.—A powerfully aromatic oil, approaching nearer to European lavender oil in odour, and probably utilizable if the cost allows.

Bay or Mountain Laurel Oil.—An essential oil with an odour like that of laurel oil.

ARTIFICIAL SALICYLIC ACID.*

Notes upon Methods for Estimating the Quantities of Homologous Acids Present.

BY ERWIN E. EWELL AND ALBERT B. PRESCOTT.

Of the homologous phenols associated in the distillates of coal-tar the first member is the chief constituent of ordinary carbolic acid, but it is well known the higher members are not altogether absent. Considerable percentages of higher phenols are common in carbolic acid. Since salicylic acid is in greater part manufactured from carbolic acid by Kolbe's process,† inquiry naturally arises as to what becomes of the higher phenols of carbolic acid used in this manufacture. It had been found some time ago* that when the higher phenols of carbolic acid are treated as they are in Kolbe's method they are changed into homologues of salicylic acid; the cresols into hydroxytoluic acids ($C_7H_6{\cdot}OH{\cdot}CO_2H$), and the xylenols into hydroxyxylenic acids ($C_8H_8{\cdot}OH{\cdot}CO_2H$), just as phenol proper is changed into a hydroxybenzoic acid.†

The presence of some other acids besides true salicylic acid (orthohydroxybenzoic acid) in the article of salicylic acid of commerce was reported by Mr. Williams in 1878.‡ He found the calcium salt of the foreign acid to be much more soluble in water than calcium salicylate is. By neutralizing a hot aqueous solution of salicylic acid with calcium carbonate, causing the salicylate of calcium to crystallize out as completely as practicable, and then acidulating the mother liquor, the unknown acid was obtained. In certain physical characters this acid was found to be distinctly different from salicylic acid, and from the other two hydroxybenzoic acids. In the leading chemical relations, however, the unknown acid was found to agree with salicylic acid and the isomers of the latter. The acid liberated from the crystals of calcium salt, after purification, was found to agree in all points with true salicylic acid. Mr. Williams concluded that the acid not salicylic formed 15 to 25 per cent. of the better grades of salicylic acid of the market. Very little further investigation of the presence and proportion of the homologous acids has been reported. In 1883 Dr. E. R. Squibb§ gave the opinion that "the better grades of the well-crystallized acid of the market contain 4 to 5 per cent. of something which is not salicylic acid," and for which, he says, he knows no test.

The physiological and therapeutic value of the homologous acids in medicinal salicylic acid are certainly deserving of careful study, in view of the large doses in which the agent is used, and the somewhat variable effects reported of these doses.

I.—A Method by Acidimetry.

The molecular weights of the homologous acids show the following differences, those of $CH_2 = 13{\cdot}97$, in arithmetical increase.

Salicylic acid (hydroxybenzoic acids), $C_6H_4OH{\cdot}CO_2H = 137{\cdot}67$.

Hydroxytoluic acids, $C_7H_6OH{\cdot}CO_2H = 151{\cdot}64$.

Hydroxyxylenic acids, $C_8H_8OH{\cdot}CO_2H = 165{\cdot}61$.

And of hundredth normal solution of alkali ($\frac{N}{100}$) needed to neutralize these acids and form monobasic salts:

One gram of salicylic acid requires 726·3 c. c.m.

One gram of a hydroxytoluic acid requires 659·4 c. c.m.

One gram of a hydroxyxylenic acid requires 603·8 c. c.m.

In the application of this method it was assumed that hydroxytoluic acids, $C_8H_8O_3 = 151{\cdot}64$, fairly represent the total acids of molecular weight above that of salicylic acid. This can be justified both because there can be only a very small quantity of xylenols in carbolic acid of respectable quantity, and because a given percentage of the xylenol product would indicate a larger percentage of the less objectionable cresol product. Thus of the ($\frac{N}{100}$) alkali solution to neutralize 1 gram of the acid—

* Read before the American Pharmaceutical Association.

† Kolbe, 1874: *Journ. prakt. Chem.*, [2], x., 89; *Journ. Chem. Soc.*, xxviii., 260; *Watts's Dict. Chem.*, vii., 1065; *Proc. Am. Phar. Assoc.*, xxiii., 374; xxvii., 463. Schmitt, 1885: *Journ. prakt. Chem.*, [2], xxxi., 397–411; *Journ. Chem. Soc.*, xlviii., 982; *Pharm. Journ. Trans.*, [3], v., 42.

* Biederman and Pike, 1872: *Ber. d. Chem. Ges.*, 5, 323; Watts's 'Dict.,' vii., 394, viii., 2023.

† The ortho-compound, $C_6H_4{\cdot}OH{\cdot}CO_2H$ (OH : CO_2H = 1 : 2). The isomers and their homologues are given in Prescott's 'Organic Analysis,' pp. 394, 434, 443.

‡ J. Williams, 1878: *Pharm. Journ. Trans.*, [3], viii., 785; *Proc. Am. Phar. Assoc.*, xxvi., 536.

§ *The Ephemeris*, i., 411, Nov., 1883.

Hydroxytoluic acids take 66·9 c. c.m. less than salicylic.

Hydroxyxylenic acids take 122·5 c. c.m. less than salicylic.

One per cent. of a hydroxyxylenic acid would indicate 1·8 per cent. of a hydroxytoluic acid. Then *the saturating capacity of articles of "salicylic acid"* made from carbolic acid will stand as follows:

For one gram of the acid tested.

	Hydroxytoluic. C. c.m.
Salicylic acid, absolute	726·3 ($\frac{N}{100}$) alkali.
„ with 5 per cent. .	723·0 „
„ „ 10 „ . .	719·6 „
„ „ 15 „ . .	716·3 „
„ „ 20 „ . .	712·4 „
„ „ 25 „ . .	709·5 „

In making trial of the calculated saturating powers of salicylic acid and its homologues, potassa and soda were found to work equally well in the standard solutions ($\frac{N}{100}$), and phenol-phthalein proved thoroughly satisfactory as an indicator of the end-reaction, while litmus is wholly incapable of being used in this estimation. The titrations are to be made as follows:

About $\frac{1}{5}$ gram of the acid to be tested, dried at or below 65° C. to constant weight, is accurately weighed, placed in a beaker of about $\frac{1}{2}$ a litre's capacity, some drops of the (alcoholic) solution of phenol-phthalein added, and (without adding water for solution) the hundredth-normal solution of alkali is run in from the burette, while stirring, until the end-reaction is approached. The beaker is now placed upon wire cloth over the flame (or otherwise promptly heated) while gently stirred, only long enough to complete the solution of the acid, and without decided boiling, when the heat is removed, the beaker-sides rinsed down with a little distilled water, and the titration completed. The weight taken : 1000 : : c. c.m. required : x = c. c.m. for 1 gram, to be compared with the table above.

In drying salicylic acid for a constant weight, it was found that this could be attained at 65° C., while at 70° to 75° C. there was a constant loss, in a short time sufficient to be registered by the balance. A portion of the purified acid from oil of wintergreen, placed between watch glasses, arranged for sublimation, and heated to 115° C., promptly gave a sublimate of colourless crystals of good size. In aqueous solution, it suffers loss by boiling at common air pressure.

Acidimetry under the directions given above was tried upon a sample of purified acid from oil of wintergreen, a sample prepared for the purpose, in the way followed by Williams:* 1 ounce of oil of wintergreen was saponified by potassium hydrate solution, the liquid cooled and acidulated with hydrochloric acid, the precipitate four times crystallized from boiling water, the hot solution filtered through strictly purified animal charcoal and re-crystallized, and lastly twice re-crystallized from alcohol. The average of several titrations of this purified salicylic acid agreed very closely with the calculated quantity, 726·3 c. c.m. ($\frac{N}{100}$) alkali for 1 gram of the acid.

Applying the same volumetric reagents in the same way to a sample of salicylic acid of the ordinary market,† in four titrations an average of 714·3 c. c.m. was obtained—corresponding to a proportion of 15 to 20 per cent. of homologous acids calculated as a hydroxytoluic acid.

With titrations of good ordinary care, using verified instruments of such delicacy as every chemist requires for analytical work, acidimetry can reveal quantities of hydroxytoluic acids as low as 4 or 5 per cent., other interfering impurities being absent.

* *Pharm. Journ. Trans.*, [3], viii., 785.

† In appearance the sample was an indistinctly crystalline powder of a slightly pinkish colour.

II.—A Method by Conversion to Phenols.

When salicylic acid and its homologues are distilled from lime they yield a distillate of their respective phenols, the elements of carbon dioxide being retained by the lime, so far becoming a carbonate. Subjecting commercial salicylic acid to this reaction, it was undertaken to apply to the distillate a limit test for composition of the produced phenols—namely, the test,* by adding an equal volume of 9 per cent. solution of sodium hydrate, and then noting the number of volumes of water to be added to cause beginning precipitation. Experiments were undertaken, with mixtures of a fairly representative cresylic acid and good carbolic acid, to obtain limits of dilution for each 5 per cent. addition of cresol in the mixture.

A cresylic acid of the market, of specific gravity 1·04, was found to yield results so far consistent that it was taken as an approximately representative cresol. Best carbolic acid of the market, with water just enough to liquefy it, was taken as phenol. From mixtures of these imperfectly pure articles preliminary data were obtained, as set forth in the following table.

Volume per cent. of cresol in the distillate.	Calculated weight per cent. of hydroxytoluic acid distilled.	After adding an equal volume of 9 per cent. sol. of soda, number volumes of water added before precipitation.
5	4·9	6·7
10	9·8	6·0
15	14·8	5·25
20	19·8	4·5
35	24·7	4·0
20	29·7	3·6
35	34·7	3·3
40	39·7	3·1
45	44·7	2·8
50	49·7	2·6

The conversion of the salicylic acid into its corresponding phenols was done as follows : 15 grams of the acid and an equal weight of lime are thoroughly dried, well triturated together, placed in a glass retort, put over a strong heat, and quickly distilled, collecting the distillate in a well-cooled receiver. To promote the distillation with great advantage, dried iron filings may be added in equal quantity to the contents of the retort. When the distillate is complete, it is liquefied by adding just enough water.

The sample of commercial salicylic acid previously tested by the method of acidimetry was subjected to this process and the distillate tested by an equal volume of 9 per cent. sodium hydrate, and subsequent dilution with measured water until after stirring there remained visible precipitation. Five volumes of water were required, indicating, according to the table above, some proportion of hydroxytoluic acid between 14·8 and 19·8 per cent., and agreeing substantially with the result by acidimetry.

It appears evident that a method by conversion of phenols can be made effectual for the estimation of homologous acids in the salicylic acid in use, and probably with closer results than those obtained by acidimetry.

III.—Separation by Solubility of the Calcium Salts. The Method of Williams.

This method, cited in the beginning of these notes, was the basis of the only estimation of the quantity of homologous acids in artificial salicylic acids which has come to the notice of the writers, and they have submitted it to a careful trial. The operation directed by

* A. H. Allen, 1878; The *Analyst*, iii., 321; Allen's 'Commercial Organic Analysis,' ii., 551; Lunge's 'Coal Tar Distillation,' 63.

Williams* was conducted three times successively. The products of each operation—that is, the salicylic acid of assumed purity on the one hand and the homologous acids assumed to be free from salicylic acid on the other hand—were subjected to estimation by the method of acidimetry.

In each of the three operations the salicylic acid was obtained from the crystals of calcium salicylate in excellent crystals, and in each case acidimetry gave results for pure salicylic acid. The mother liquors, treated for separation of the homologous acids,† yielded acid agreeing with that described by Williams, acid differing greatly from salicylic in physical properties. This "homologous acid," subjected to acidimetry, gave, for 1 gram of the acid (1) 705 c.c., (2) 699 c.c., and (3) 697 c.c., of the hundredth-normal solution of alkali, the average being 700·3 c.c. By the average of these estimations, then, the "homologous acid" still retained 61 per cent. of salicylic acid, against 39 per cent. of hydroxytoluic acids, and in estimation (3), where the separation was carried further than in the other two trials, there remained over 50 per cent of salicylic acid. Indeed, the process of crystallization does not promise well for estimation, unless by some system of allowances and for an approach toward exact determination.

COTTON-SEED OIL.‡

The following is taken from a description of the cotton-seed oil industry furnished by Mr. A. E. Thornton to a reporter of the *Atlanta Constitution*.

From the platform where the seed is unloaded, it is thrown into an elevator, and carried by a conveyor—an endless screw in a trough—to the warehouse. Then it is distributed by the conveyor uniformly over the length of the building, about 200 feet. The warehouse is nearly half-filled now, and thousands and thousands of bushels are lying in store. Another elevator carries the seed up to the "sand-screen." This is a revolving cylinder made of wire cloth, the meshes being small enough to retain the seeds, which are inside the cylinder, but the sand and dirt escape. Now the seeds start down an inclined trough. There is something else to be taken out, and that is the screws and nails and rocks that were too large to be sifted out with the sand and dirt. There is a hole in the inclined trough, and up through that hole is blown a current of air by a suction fan. If it were not for the fan, the cotton-seed, rocks, nails, and all would fall through. The current keeps up the cotton seed, and they go on over, but it is not strong enough to keep up the nails and pebbles, and they fall through. Now the seed, freed of all else, is carried by another elevator and endless screw conveyor to the "linter." This is really nothing more than a cotton gin with an automatic feed.

Then the seed is carried to the "huller," where it is crushed or ground into a rough meal about as coarse as the ordinary corn "grits." The next step is to separate the hulls from the kernels, all the oil being in the kernel. Hence the crushed seed is carried to the "separator." This is very much on the style of a sand screen, being a revolving cylinder of wire cloth. The kernels, being smaller than the broken hulls, fall through the broken meshes, and upon this principle the hull is separated and carried direct to the furnace, to be used as fuel. The kernels are ground as fine as meal, very much as grist is ground, between corrugated steel "rollers," and the damp, reddish-coloured meal is carried to the "heater."

The "heater" is one iron kettle within another, the 6-inch steam space between the kettles being connected direct with the boilers. There are four of these kettles side by side. The meal is brought into this room by an elevator, the first "heater" is filled, and for twenty minutes the meal is subjected to a "dry cook," a steam cook, the steam in the packet being under a pressure of 45 pounds. Inside the inner kettle is a "stirrer," a revolving arm attached, at right angles, to a vertical shaft. The stirrer makes the heating uniform, and the high temperature drives off all the water in the meal, while the fixed oil all remains.

In five minutes the next heater is filled; in five minutes the next, etc.

Now there are four "heaters;" and as the last heater is filled, at the end of twenty minutes the first heater is emptied. Then, at the end of five minutes, the first heater is filled, and the one next it is emptied, and the rotation is kept up, each heater full of meal being "dry-cooked" for twenty minutes.

Corresponding to the four heaters are four presses. Each press consists of six iron pans, shaped like baking pans, arranged one above the other, and about five inches apart. The pans are shallow, and around the edge of each is a semi-circular trough, and at the lowest point of the trough is a funnel shaped hole to enable the oil to run from one pan to the next lowest, and from the lowest pan to the "receiving tanks" below.

As soon as a "heater" is ready to be emptied, the meal is taken out and put into six hair sacks, corresponding to the six pans in the press. There are six hair mats, about one foot wide and six long, one side of each being coated with leather. The hair mat is about an inch thick. Now the hair sack containing 10½ to 11 pounds of heated steaming meal, is placed on one end of the mat, and the meal distributed so as to make a pad or cushion of uniform thickness. The pad of meal is not quite 3 feet long, a foot wide, and 3 inches thick, and the hair mat is folded over, sandwiching the pad, and leaving the leather coating of the pad outside. In this form the six loads are put into the six pans, and by means of a powerful hydraulic press the pans are slowly pressed together. The oil begins trickling out at the side, slowly at first, and then suddenly it begins running freely. The pressure on the "loads" is 350 tons. After being pressed about five minutes the pressure is eased off and the "loads" taken out. What had been a mushy pad 3 inches thick is a hard, compact cake about ¾ of an inch thick, and the sack is literally glued to the cake. The crude oil has a reddish, muddy colour, as it runs into the tanks. In each mill there may be seen lying great heaps of sacks of yellowish meal—the cakes which have been broken and ground up into meal. That, as explained above, forms the body of all fertilizers. The following is a summary of the work for the eight months' season at the Atlanta mills:

15,000 tons of seed used give:
15,000,000 pounds of hull.
10,331,250 pounds of meal.
4,668,750 pounds of oil.
300,000 pounds of lint cotton.

The meal is worth at the rate of 6 dollars for 700 pounds, or 88,603·58 dollars.

The oil is worth 30 cents a gallon, or 7½ pounds, or 186,750 dollars.

The lint is worth 18,000 dollars, making a total of 293,393 dollars, and that does not include the 15,000,000 pounds of hull.

* 1878. *Pharm. Journ. Trans.*, [3],viii., 785; *Proc. Am. Phar. Assoc.*, xxvi., 536.

† The acid not salicylic has usually been designated in the singular number, and it may be that only one homologous acid occurs in the manufactured article. But as there are three isomeric hydroxytoluic acids, to say nothing of the hydroxyxylenic, in the absence of any identification of these isomers in "homologous acid," it is well to recognize their existence in the plural. Melting points of the hydroxy-toluic acids have been reported as follows:

Acid—CO_2H : OH : CH_3=1 : 2 : 3—melting at 160° C.
Acid ,, ,, ,, =1 : 2 : 4— ,, ,, 173° C.
Acid ,, ,, ,, =1 : 2 : 5— ,, ,, 151° C.

‡ From the *American Druggist*, October.

The Pharmaceutical Journal.

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Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

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THE MEDICINE STAMP DUTY.

THE history of the Medicine Stamp Acts, as recounted in the work lately produced on the subject by Mr. E. N. ALPE, presents several points of interest to which it may be worth while to direct the attention of our readers, and especially those who are disposed to regard the Medicine Stamp Acts as having been conceived and passed with the main object of persecuting chemists and druggists. In 1783, when the first Act was passed, it is probable that chemists and druggists had little to do with the sale of nostrums, and as a class could hardly have counted for much in the consideration of those who suggested that the trade in quack medicines should be made contributory to the revenues of the State. The financial necessities of the time were such that there was little difficulty in discovering "very proper objects of taxation," and the traffic in nostrums and patent medicines had then become sufficiently flourishing to be regarded in that light as the probable source of some fifteen thousand a year. It was upon that very modest basis that the imposition of a medicine stamp duty was proposed by Lord JOHN CAVENDISH, the Chancellor of the Exchequer at the time, and adopted by Parliament. The provisions of the Act then passed (23 Geo. III., c. 62), were rather of a protective nature in regard to surgeons, apothecaries, druggists, and chemists, for they were exempted from the obligation, imposed on all other vendors of medicines, annually to take out a licence. Moreover, the *ad valorem* duty, from which the chief contribution to the Revenue was expected, applied only to medicines supplied in an extra-professional manner by vendors who did not belong to the above-mentioned classes. The business of compounding medicine and making up physicians' prescriptions was then almost entirely in the hands of apothecaries, one of the classes exempted from the obligation to take out a licence for the sale of medicine, so that none of the medicines supplied by them would be chargeable with stamp duty, and outside the exempted classes there were scarcely any to contribute to the tax but quacks and herbalists. As a consequence the anticipations in respect to the Act as a tax raising machine were probably far from being realized, and it was superseded two years later by another Act of wider scope (25 Geo. III., c. 79), by which the medicine stamp duties were practically established upon their present basis. The exemptions provided for were intended only to cover the sale of crude drugs and medicines compounded from physicians' prescriptions, or dispensed by qualified medical practitioners in the ordinary course. To this Act was appended a schedule of eighty-four medicinal preparations, to which it was intended to apply specifically, and the sixteenth section extended the imposition of duty generally to every packet, box, bottle, phial, or other inclosure containing any drugs, oils, waters, essences, tinctures, powders, or other preparation or composition whatsoever used or applied, or to be used or applied externally or internally as medicines or medicaments for the prevention, cure or relief of any disorder or complaint incident to, or in anywise affecting the human body, which shall be uttered or vended in Great Britain. This Act of 1785 is embodied in all its essential features in the law now in force, although the schedules appended to the Act have been subjected to alterations.

Probably one of the chief reasons for the amendment of the law relating to medicine stamp duty in 1785 was the insufficiency of the first Act to reach many of the nostrums that were in repute at the time. That these were very numerous may be gathered from the 'Pharmacopœia Empirica' published in the *Gentleman's Magazine* in 1748, enumerating no less than two hundred and two articles of the kind, with the prices at which they were sold, the names and addresses of the proprietors, and the ailments which they were said to cure, in order, as it was said, that persons who could not afford the expense or might not care to be governed by the advice of the physician and apothecary might know where to apply on occasion for an appropriate remedy. Many of the nostrums there mentioned belonged to and were sold by persons who, with or without authority, prefixed the title of "Dr." to their names; but whether the proprietors of these articles were medical men or not, it is at least evident that the popular taste for amateur physicing was probably no less general then than it is now. It was really against preparations of this class that the imposition of medicine stamp duty was directed, and it was not until chemists and druggists at a later period became the agents for the sale of such preparations that they as a class came under the operation of the law relating to medicine stamp duties. There can be little doubt that it would have been well for the interests of the class if the sale of so-called "patent medicines" had never been promoted as it has been by the assistance of chemists and druggists. But since the law relating to

medicine stamp duty was in force before that happened, there can be no reason for regarding it as specially oppressive to chemists and druggists, as has sometimes been done. So far as the motive of the Acts can be judged of, in relation to the legitimate exercise of pharmacy and medicine, it would appear to have been in favour of the interests of both callings, and to have been essentially of a protective tendency. After several successive enactments, amending the law relating to medicine stamp duty, the Act of 1812 was passed (52 Geo. III., c. 150), which contained a new penalty section for the sale of dutiable preparations unstamped, differing only to an immaterial extent from that which it superseded. This Act had also a new schedule containing the names of five hundred and fifty articles, among which were artificial mineral waters and waters impregnated with soda or mineral alkali or with carbonic acid gas. These latter articles were subsequently exempted by the Act of 1833 (3 and 4 Will. IV., c. 97, s. 20). At a later period (27 and 28 Vict., c. 56, s. 6) the duties on licences for the sale of medicines were transferred from the Department of Stamps to the Excise, and still more recently the licence duty was fixed at the reduced uniform rate of five shillings. This last change, though strongly advocated by chemists and druggists in many instances, was one decidedly opposed to their interest, and has led to a vast extension of the sale of stamped medicinal preparations by all classes of general dealers.

Incidentally, an interesting point is raised by Mr. Alpe as to the meaning of the technical phrase "patent medicine" which is universally applied to preparations of the class now under consideration. Many of them are undoubtedly in no way entitled to be so called, except by reason of common usage of the term. But Mr. Alpe points out that the technical meaning of the phrase "patent medicine" has not yet been the subject of judicial interpretation. He is also of opinion that there can scarcely be any doubt that this term covers only such preparations as are strictly patented articles, sold under the authority of letters patent, and that it does not include other dutiable medicines which are only called "patent medicines" in the loosest possible popular language. In the same sense it is considered open to question whether, having regard to the Pharmacy Act, the specification of any medicine containing one of the scheduled poisons would pass the Great Seal. It has been urged in opposition to the medicine stamp that it enables persons to evade the provisions of the Pharmacy Act in regard to the sale of poisons, and no doubt many so-called "patent medicines" contain scheduled poisons. Mr. Alpe, however, considers that their present immunity certainly does not arise from the 16th section of the Pharmacy Act, and according to that view, the sale of such preparations would be illegal unless they bore the requisite poison label. Even in that case, moreover, it would be illegal for any person to sell such preparations, except registered chemists and druggists. This is a purely legal point, but it is one that merits some careful consideration, especially when it is remembered that many members of the medical profession have expressed very decided opinions as to the mischief occasioned by the indiscriminate sale of secret preparations containing poison. If the view put forward by Mr. Alpe be correct, no preparation containing a scheduled poison could lawfully be sold by persons who are not qualified for that purpose by registration under the Pharmacy Act, except the preparation were really a patented article. Then in either case such a preparation would also have to be sold in accordance with the provisions of the seventeenth section of the Pharmacy Act with a poison label attached, and thus the protection of the public contemplated by the Act would be provided.

We are glad to call attention to the fact that the opening meeting of the Midland Counties Chemists' Association was held in the Mason College, Birmingham, and that Mr. Perry, the President, referred to this circumstance as marking a new epoch in the existence of the Association. The library of the Association is now placed in the College, and there seems to be some reason for anticipating that at no very distant time the professional teaching of subjects connected with pharmacy may be carried out there with such a completeness and thoroughness as its resources would ensure.

* * *

The classes for pharmaceutical students in connection with the Leicester and Leicestershire Chemists' Association commenced on the 24th ult. There is a class for Practical Pharmaceutical Chemistry, which meets on Wednesday evenings; one on the Chemistry of the British Pharmacopœia, meeting on Friday evenings; and a Preliminary Class. Further information can be obtained by application to the Honorary Secretary, Mr. J. J. Edwards.

* * *

At the next meeting of the Chemists' Assistants' Association, which will be held in the rooms, No. 103, Great Russell Street, on Thursday evening, November 1st, a paper will be read on "The Chemical Processes which accompany the Germination of Seed," by J. R. Green, M.A., B.Sc., Professor of Botany to the Pharmaceutical Society.

* * *

The first meeting of the Chemical Society for the present session will be held on Thursday, November 1st, when a paper will be read on "The Constitution of the Terpenes and of Benzene," by Dr. W. A. Tilden.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

October 16, 17, 18 *and* 19, 1888.

Present on each day—Mr. Bottle, Vice-President; Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Professor Sir Douglas Maclagan was also present on each day on behalf of the Privy Council.

MAJOR EXAMINATION.

16*th.*—*One* candidate was examined, but failed to pass.

MINOR EXAMINATION.

16*th.*—*Eleven* candidates were examined. *Five* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Abbott, James .....Glasgow.
Barnes, Colin Miller .....Sunderland.
Cameron, John .....Aberfeldy.
Dunning, Matthew .....Glasgow.
Ferguson, John .....Falkirk.
Gilbert, Joseph Anthony .....Manchester.

17*th.*—*Thirteen* candidates were examined. *Seven* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Henderson, Thomas Cuthbert..Lochee.
Hetherington, Thomas .....Moffat.
Joiner, Alexander .....Portsoy.
Jones, John Maurice .....Conway.
Lindsay, John James .....Aberdeen.
Livesey, Alfred .....Glasgow.

18*th.*—*Thirteen* candidates were examined. *Five* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Kershaw, Arthur Noble.. .....Halifax.
Kirk, James .....Edinburgh.
McDonald, James .....Dundee.
McGibbon, Charles George ...Liverpool.
Marshall, Hay McDugald Grant.Elgin.
Mennie, Robert .....Aberdeen.
Mitchell, John .....Inverness.
Nicol, George Henry .....Dumfries.

19*th.*—*Ten* candidates were examined. *Five* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Stenhouse, Robert .....Dalkeith.
Taylor, Dugald.....Helensburgh.
Taylor, Joseph Edward .....Wrexham.
Thom, John ....Forfar.
Thompson, William Shout.....Bradford.

MEETING OF THE EXECUTIVE OF THE NORTH BRITISH BRANCH.

A meeting of the Executive of the North British Branch was held in the Society's house, 36, York Place, Edinburgh, on Wednesday, October 24, at 1 p.m.

Present, Messrs. Boa, Gibson, Gilmour, Mackenzie and Stephenson, Edinburgh; Fisher, Dunfermline; Hardie, Dundee; Kermath, St. Andrews; Kinninmont, Glasgow; Lawrence, Oban; Nesbit, Portobello; Paterson and Strachan, Aberdeen; and Watt, Haddington.

Apologies for absence were received from Messrs. Frazer, Glasgow; Maben, Hawick; Mackay, Edinburgh; and Storrar, Kirkcaldy.

Mr. Watt, Haddington, having taken the chair, the minutes of last meeting were read and approved.

Mr. Nesbit stated that the alterations referred to at last meeting had been mainly carried out, but were not yet completed. They had proved satisfactory, and would be fully reported upon at a future meeting of the Executive.

The Chairman then called upon the Assistant Secretary to read the following letter from Mr. Baildon:

"Duncliffe,
"*September* 27, 1888.

"Dear Mr. Watt,—It is with much regret that I write to ask you to lay my resignation of the Chairmanship of the Executive of the North British Branch of the Pharmaceutical Society before the first meeting of that body. This step follows from another I have felt compelled to take, viz.: the resignation of my seat on the Council of the Society, owing to the impossibility of attending its meetings with sufficient regularity during the coming winter. I feel I really should have stood firm at the last meeting of the Executive and refused to take the Chairmanship again; but the members were so kind in their expressions of confidence that I was weak enough to yield against my own judgment. I do trust that now you will consent to fill the chair, and that I may hand over my Treasurership to you at once, at least after the October meeting of Council, when my letter of resignation will be read.

"I can hardly tell you the pain, I had almost said the shame, with which I take this step; it must seem so ungrateful to you and the other members of the Executive who have so often done me honour, and have so recently pressed honour on me again. All I can now do is to thank you all most cordially, and to express the fervent hope that anything I have been able to accomplish for the Branch and the Society may in the future prove a real and lasting benefit. Kindly convey to my colleagues my hearty greeting and my official—but I trust not personal—farewell.

"I am,
"Dear Mr. Watt,
"Yours sincerely,
(*Signed*) "H. Bellyse Baildon."

The Chairman said he was sure he expressed the feelings of every member of this Executive, when he said that they felt that in the retirement of Mr. Baildon there was a loss to pharmacy and a great loss to that body as an Executive. He felt it as a personal loss to himself, for Mr. Baildon was one whom he esteemed very much, for he was always willing to give them his aid and counsel in anything they required. He (Mr. Watt) did not intend to say anything as chairman of this meeting with reference to Mr. Baildon's character; he would rather leave that to Mr. Stephenson, whom he would ask to move a resolution on the subject. All he would say was that although Mr. Baildon had left them yet he was not far away from them, and that they would have his personal sympathy, and he had no doubt his personal continuance at their meetings and at their social gatherings.

Mr. J. B. Stephenson said he was desirous that they should place upon their minutes an endorsement of what Mr. Watt had said in regard to Mr. Baildon. Mr. Baildon had thrown himself into their movement within the last few years with great heartiness, and that had done him a great deal of credit, because he had not the nationality which was the humble motive with most of them. They all knew the resources of Mr. Baildon, his culture and his gifts, and he thought they would all admit these were fully placed at their service during somewhat difficult negotiations. Mr. Baildon's gentlemanly bearing and his genial courtesy and amiability went without saying. The first thing they had to perform that day, however, was to look to the vacancy which Mr. Baildon's retirement made on the London Council. Of course the election to the vacancy in the Council lay exclusively with the London Council. The Council had the power of filling up any vacancy which occurred during the year. The

constitutional way, the ordinary way, and proper way, would be to take Mr. Watt, because his name was next on the last voting list, and within very few marks of the man who was before him. He (Mr. Stephenson) had no doubt that the Council would take that view. All the same, he would be inclined—he thought it fell upon them—to send something like a nomination of Mr. Watt, or, to put it more correctly, that Mr. Watt be recommended to fill the vacancy. A Scottish member had vacated his seat, and there was no Scottish member now on the Council, and therefore it was their duty to make their wishes and desires known. From what they knew, he believed there would be no difficulty in the matter, for he was assured that the London Council were quite agreeable to meet the views of the North British Branch. As they were aware, it was a free election on the part of the Council, but the only thing needed, he thought, was Mr. Watt's willingness to act. The next thing that would come up was the filling up of Mr. Baildon's place on the executive. It would fall upon them to elect another Chairman, but that duty would come on later in the proceedings. What he thought, however, was, that it would be a proper thing, a reasonable thing, to pass a resolution which might be expressed in their minutes with reference to Mr. Baildon's services, an extract of which might be sent to him. He had therefore to move:—

"The Executive of the North British Branch have heard with great regret Mr. Baildon's letter announcing his retirement from the Executive here in consequence of his resignation of office as a member of Council. The Executive are constrained to admit the necessity of the step which he has taken, but they feel that it occasions a blank which it will be very difficult to fill. During the last few years Mr. Baildon has rapidly come to take one of the very foremost places as a leader among his colleagues, owing not more to his gentlemanly bearing and amiable disposition than to his gifted and cultured mind, the resources of which have been freely devoted to the service of the Society, and of the North British Branch in particular. Previous to that time Mr. Baildon had contributed to the Evening Meetings of the Branch a series of papers singularly beautiful in style and illustration. These are recorded *verbatim* in the Journal, and they have since been published in book form under the title of 'The Spirit of Nature,' and they constitute a permanent memorial of which the Branch is justly proud. In parting with Mr. Baildon the Executive beg to record their great personal regard for him, their warm appreciation of the many services he has so freely rendered them, and their heartiest wishes for his success in his new sphere of action."

Mr. James Mackenzie desired to second the adoption of the resolution. He remembered the time when Mr. Baildon and he stood for the Council, and he thought also of the great satisfaction which their late Chairman had given, ever since he had been elected. When Mr. Baildon was elected, he recollected the pair of them were in the Inns of Court Hotel. Mr. Baildon was anxious, both in fact were anxious, and both, he might candidly confess, expressed the desire that they would not be elected. On the result being made known, he congratulated Mr. Baildon, but that gentleman turned round and said that he wished with all his heart it had been otherwise. He (Mr. Mackenzie) had been in the hope that although Mr. Baildon had retired from business, he would continue to give them his beneficial aid and time, but it was a pleasure to know they would secure a successor worthy to occupy Mr. Baildon's position.

The motion was unanimously adopted.

The Chairman said the next business was the nomination by the Executive of Examiners.

Mr. W. R. Kermath, St. Andrews, had pleasure in proposing the gentlemen who had acted during the last term.

This was seconded by Mr. Fisher, Dunfermline, and unanimously agreed to.

The Chairman in moving that the arrangements for the evening meetings in the coming winter be remitted to the General Purposes Committee, said it was desirable these meetings should be kept up with spirit, and that there should be interesting papers. He regretted much personally that he was unable to be present at the whole of them, but he would try this winter to be present at some of them.

Mr. Nesbit, Portobello, said the next business they had to face was the appointment of a Chairman. He had felt very much disappointed when he heard of the resignation of Mr. Baildon, for he thought it would knock their winter sessions on the head. In ordinary course their Vice-Chairman would have fallen into his place, but it was necessary that the Chairman, who also acted as Treasurer, should reside in Edinburgh. They could do well enough with a Vice-Chairman residing at Haddington, but they must have the Chairman located in Edinburgh. He therefore regretted he could not propose Mr. Watt, and therefore the best thing they could do was to elect Mr. Wm. Gilmour, Edinburgh. That gentleman was in every way qualified to fill the position. For many years he occupied the position of President of this body, when it was a Council, and since they had had an Executive he had been most assiduous in his attention to his duties; therefore he would in every way acquit himself as Chairman to their advantage. Mr. Gilmour he had heard called the "Nestor of Pharmacy," and on that account, as well as others, he proposed his election.

Mr. Mackenzie, Edinburgh, seconded the nomination. It was he said gratifying to think that their path had been smoothed over in getting so estimable a man as Chairman.

The motion having been adopted, Mr. Gilmour returned thanks. He said he really did not know how to express his feelings in connection with the proposal made and so unanimously acquiesced in by the members. There was one thing he would require to practice, that was self-sacrifice. If Mr. Watt was prepared to undertake the duty of representing them in London in a way that must commend them to everyone, he (Mr. Gilmour) ought also to give his aid to the profession, as should all who had the interests of pharmacy at heart. He accepted the honour conferred upon him, and he accepted it in the hope that he would be able to do some good service. It might not be much, but he would do his best.

Mr. Watt said he desired in a few words to say that he felt very much the responsibility of the position in which they intended to place him by nominating him for the Council in London. He must say that he felt that this was the time when personal sacrifice must be made. If pharmacy was to go down, or to go on, there must be individual sacrifice, and he felt that if he could, in the position in which they had placed him, be of the slightest use, he would endeavour to meet their views. He knew that there were immense difficulties before them, but he had not the smallest doubt that if the pharmacists of this country were unanimous, and the Council unanimously worked with them, there was nothing they could not accomplish. He was quite satisfied of that. There was no doubt that at present they were all at sixes and sevens, without a head and without action, with the mistake of, not discord, but of separation and not union; and therefore he felt that if he could be of the slightest service on the Council in London he would make an effort. He might tell them there was nothing he ever attempted that he did not succeed in. That was a strong statement to make, but it was really the case. Though he

was fully occupied at home, and finding the busiest years of his life near the end of it, their sympathies and unanimous opinion would support him. If the Council did him the honour to elect him, and it was a free election, he would cheerfully on their account accept the office.

Mr. Lawrence, Oban, asked if it lay within the power of this Executive to secure for chemists and druggists exemption from jury service?

Mr. Watt: We would require an Act of Parliament. Pharmaceutical chemists are exempt in England.

Mr. Mackenzie said the Court was always ready to listen to a chemist's objection to serve. He himself had got off from serving in the City of Glasgow Bank directors' trial by making use of the argument that he might be called for.

Mr. Nesbit said the Juries Act which was passed did not apply to Scotland.

Mr. Stephenson remarked they might have got a clause at the end of that Act stating it applied to Scotland. It was not a new subject, for they had appealed regarding it before. He was one of a deputation to Lord Moncrieff, when he was Lord Advocate. His lordship sympathized with them very much, saying, "It might be a hardship, but I think you start from a wrong principle entirely. It is not a grievance; it is a duty and a privilege of British citizens."

Mr. Lawrence said it was a great hardship on a country chemist, who had frequently to travel fifty or sixty miles.

The subject then dropped.

On the motion of Mr. Paterson, Aberdeen, a vote of thanks was accorded Mr. Watt for presiding.

Provincial Transactions.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The opening meeting of the session of the Midland Counties Chemists' Association was held on Tuesday evening at the Mason College, Birmingham. Hitherto, the gatherings have taken place at the Grand Hotel, but an arrangement was entered into with the authorities at the college some time back, by which it was arranged to hold future meetings at that institution. The President (Mr. G. E. Perry) occupied the chair, and after some letters of apology for unavoidable absence had been read, including one from Professor Tilden, he delivered his inaugural address as follows:—

Inaugural Sessional Address.

Gentlemen,—It is again my pleasing duty as your President for another year to address a few words to you at the commencement of our session. I am afraid though it has been rather a mistake on your part to have elected me to so responsible a position for the second time in succession, if only on account of this Inaugural Address, for, save in exceptional instances, more interest must naturally attach to the utterances of a newly elected occupant of this chair than to those of one with whose views on general pharmaceutical matters members are more or less already familiar. I fear, therefore, that in what I may have to say to you to-night, it will be felt that I am but telling an oft-told tale, and giving expression to views and ideas which have before been put forward by others more entitled to be heard than myself. Nevertheless, I have thought that in the altered and exceptional circumstances under which we as an Association fortunately find ourselves at the beginning of this session, it might perhaps be desirable that I should endeavour to supplement, as far as I am able, what I have said on a former occasion on the position and prospects of pharmacy. If it serve no other end it will, at any rate, enable the historian of the future to place on record the fact that the Midland Counties Chemists' Association, at this stage of its existence, took a new departure in that it met for the first time at the Mason College—the scientific college of this town—and that pharmacy, according to its then President, was, at this period, in such and such a condition.

It is certainly a pleasure to me to-night that I am enabled to address this Association within the walls of this College, the privilege of meeting here, and further, of placing our library here, having been graciously accorded to us by the Mason College authorities. As you know, for some long time we have been more or less in the condition of a wandering tribe, not knowing where to pitch our tent, and having no permanent resting place. Our books, too, have had to be sheltered, as they kindly have been, by our respective librarians, who, fortunately for us, have always had room enough to store them. This unsatisfactory state of things for a local association has now happily ceased to be, and we have at last found here a home. The best thanks of our Association, you will agree with me, are due to the authorities of this College for their kindness, and in particular to our friend, Professor Tilden, whom, as an old Bloomsbury student, we always fancy we have some claim upon, and who, in this matter, has lent the weight of his advocacy to the application which I was requested to make on your behalf.

I think this Association has every reason to be satisfied with—I was going to say proud of—the step in advance—for a step in advance I submit it is—which we have been able to take in locating ourselves here. It at once does credit to the broad spirit which characterizes the governing body of this College in recognizing our claim as a scientific Society, and gives us hope for the future. For may we not reasonably look forward to the, I trust, not very distant time when we shall have a professor of pharmacy in this College, and when pharmacy, and its kindred subjects of chemistry, materia medica and botany, will be taught with a completeness and thoroughness which for pharmacists has hardly been possible outside our alma mater at Bloomsbury, and it may be, even more comprehensively than at all times it has been possible for various reasons to teach those subjects there?

But, gentlemen, while I would fain to-night look ahead, and shut my eyes to whatever may be suggestive of discomfort or worse, I cannot ignore the fact that our pharmaceutical bark is not yet quite free from the rocks and whirlpools which of late have imperilled her, and which occasion no little trouble to her still. In one direction, at any rate, we pharmacists feel that we are suffering an injustice. As if it were not enough for us, in common with other legally qualified bodies, to have to meet the competition which obtains, and is so keen amongst ourselves in the present day, we have to face a most unjustifiable competition from without. (I alluded to this matter in my address of last year, and I have felt constrained to refer to it again to-night.) Our ranks—we are no exception in this respect to all other businesses and professions—our ranks are so full that there can be no possible danger to the public of any monopoly being created, or of our services being other than modestly paid for. We do not object to this; on the contrary, conservative as we are in our tendencies, we recognize the necessity of adapting ourselves to the altered conditions of the times in which we live. That is all that should be required of us, that is all that in common fairness should be expected from us. But we know it is otherwise.

The manufacture of bogus companies, which is going on everywhere, constitutes a very harassing interference with the legitimate pharmacist, and detracts, in a greater or less degree, from that active interest which

pharmacists, even in spite of it, are increasingly taking in the welfare and progress of their calling. I cannot bring myself to think that the promoters of the Pharmacy Act ever contemplated such a condition of things. It could never have been the intention of the legislature that the individual; the personally qualified individual, whom it created should be subjected to the assaults of those who had no legal claim to such a position. To the lay mind the reading of the Act presents no difficulty; but it has remained for others to put, as we submit, a strained and illogical construction upon it, which has resulted, so far as the legal status is concerned, in somewhat of a dead-lock in the affairs of pharmacy. We think, if it be necessary at all in the interests of the public, that for the proper discharge of the duties appertaining to a pharmacist in his capacity of keeping open shop for the dealing in and dispensing of poisons and poisonous compounds—if it be necessary for this that he should possess a personal legal qualification, then we say that this qualification should be imposed on all individuals and associations of individuals alike. This is our contention and what we take it to have been in the minds of those who drafted the Act of 1868. As it is, the Act is simply nullified by this resort to the formation of so-called limited liability companies for the purpose of carrying on the business of a pharmacist. It is a very simple matter, as you are aware, for any unqualified individual, in collusion with six others, who probably have no actual interest in the business beyond perhaps the possession of a single share—it is a very simple matter for him in this way to form a company, and thus overcome the otherwise insurmountable difficulties of the Act. Well, I say all this is very harassing to the legitimate pharmacist and ought not to exist.

The Council of the Pharmaceutical Society, as you know, has attempted, by the action taken against these trading companies in London and Edinburgh, to get a common sense construction put upon the Act, but hitherto its efforts have been unsuccessful. The question, however, of the individual liability of the persons composing these companies cannot, I think, be regarded as settled, and hence it is to be hoped that the Council will see its way, as soon as practicable, to further testing this point in the English Courts. It is probable that the Companies Bill introduced by the Government will, if passed into law, exercise a very salutary effect upon the formation of such associations. It will almost certainly restrain the formation of the smaller companies which are set agoing for the very purpose of evading the Pharmacy Act in the carrying on of the business of a chemist and druggist.

Besides this poaching on our preserves by these trading companies there is another and a growing evil. The supply of drugs and the preparations of the pharmacopœia to the public is now being carried on to an alarming extent by a number of other unqualified individuals—shopkeepers of various grades—in every locality; and this practice, unknown on the continent, though not provided against by the Act of Parliament, is, nevertheless, a serious detriment to the pharmacist, and contributive in no sense to the public health and safety.

These matters have, however, been dealt with so fully on so many occasions by prominent men amongst ourselves, and by others—more particularly by Professor Attfield—that I cannot hope by any thing I may say to add weight to what has been already advanced as to the injurious effects of these and other existent evils upon the present position of pharmacy in this country. Pending any action which the Pharmaceutical Council in its wisdom may see fit to take with the view of obtaining—if that be possible—a fuller recognition by the State of its duty both to the public and to ourselves—pending this, I have thought it might be profitable or us to-night to consider if in any way, or by any means, it is open to us to strengthen our position, and if, in any direction, we may reasonably look for any real improvement in the social and financial condition of pharmacy.

Well, gentlemen, I am, as you know, one of those who anticipate a brighter future for pharmacy. I could wish though for more discipline in our ranks, for a more generous attachment to the parent Society, for greater unanimity of feeling, for more banding of ourselves together for a common end and for a common good. All this, however, may come. Meanwhile, as individual pharmacists, let us see in what way we can best help ourselves, and at the same time best further the cause we have so much at heart.

Now, whatever else may contribute to our future success, there will, I am assured, be over and above all one chief and indispensable factor, and that is, *work*. The loss of income from the purely trading side of our calling, which we are experiencing more and more every year, will undoubtedly, if we intend to exist, force this upon us. We shall no longer dare to be indolent or indifferent; it will no longer suffice for us to be content with the knowledge of our possessing a qualification, which we fondly think ought to ensure us a comfortable livelihood, without exerting ourselves to demonstrate to those upon whose appreciative support we depend the character and extent of our attainments and our skill. Folly will it be to "omit the cares of husbandry, and then expect the blossoms of Arabia."

And there must be a reality about our work. We shall need more than ever to take an intelligent interest in all that goes to make up pharmacy proper; but whether on the trading side of our calling, or on the more important scientific side—which is capable of a much larger development—we shall need energy, we shall need enterprise, if we would keep abreast of the advance which everywhere and in everything is so marked. You will remember, perhaps, many of you, what Mr. Goschen, the present Chancellor of the Exchequer, had to say in his admirable address some little time back to the students of Aberdeen University, in reference to the desirability of taking more interest in the particular business or calling in which one might be engaged. "The man," he said, "who, however instructed, mentally swears at the work to which he is condemned, who regards it as a drudgery to be done from necessity, or from a sense of duty, but to be got over as soon as possible and forgotten, is at a disadvantage in competing with the man to whom that work is constantly suggesting topics of interest, and to whom it is therefore not a drudgery, but a pleasure." And then, coming nearer home, we find Professor Tilden—himself no mean example of what interest in work can accomplish—expressing himself to the same effect when he advised the students at Bloomsbury, some years ago, to find, if possible, their "hobby" in their business. "If you make," he went on to say, "your business this real occupation of your life, it will certainly yield you a harvest, not merely of internal satisfaction, a reward rich enough in itself, but tangible advantages, such as commend themselves to the commercial mind, are equally certain to accrue." "It is," as Mr. Benger says, "the constant study of details, the accumulated experience of many days, which enables a man to build up a reputation, and one thus securely built will stand a good deal of battering from without."

Gentlemen, I am not sure that, speaking of pharmacists generally, there has been, if indeed there is, to the extent, or in the direction that is desirable, that absorbing interest in their life's work, which it is so important should characterize us. There is, so far as I can gather, rather a tendency with many to take an altogether pessimistic view of their position, to be continually crying out that pharmacy as a profession

is not worth the following, and to act, or more generally, to drift into inaction, accordingly.

Well, if we are fortunate enough to be possessed of this love for our work, we shall then I think try to get a clearer perception first of what as pharmacists is expected from us, but more particularly of the services we ought to be able to render to the community, and more especially to the particular locality in which our lot may be cast. We shall ever be on the watch for, ever eager to seize opportunities of applying the scientific knowledge we possess, and shall direct our energies into paths where the uneducated and untrained are unable to follow us and powerless to compete with us. This, if we have a high ideal, and are content but to work and to wait, cannot fail in the long run to bring its reward. The increased and ever increasing confidence of the public will be reposed in us; and, though in the fierce struggle for existence which is going on around us, the demand for cheapness may make itself felt perhaps more and more, I do not despair that in the future, as in the past, honest labour will command its honest equivalent, or that the pharmacist, in proportion to his worth, and in proportion to the extent to which he shall exercise, for the public welfare, the special skill of which he should be the undoubted possessor, that in such porportion will his services be recognized and remunerated.

But unless, gentlemen, our scientific attainments be in advance of those possessed by, I fear, a majority of those practising pharmacy at the present, I do not see how we can expect any substantial increase in the demand for our services to arise. Pharmacy, from various causes, but more particularly owing to the tenacity with which so many medical men have clung to the dispensing of their own medicines, though it has made huge strides, has not perhaps quite realized the anticipations of those who were instrumental in giving it a "local habitation and a name." Consequently the practitioners of pharmacy, throughout its history, have always, to a greater or less extent, looked to the profits arising from extraneous business to supplement the income derivable from the more pleasureable but yet insufficiently remunerative pursuit of their more legitimate calling. This extraneous business, as we are well aware, has for some time been gradually drifting into other hands, and it can only be regained and retained on a purely commercial and competitive basis.

As regards dispensing, although from those engaged in the higher walks of the profession we have now and again the hope expressed, and the recommendation given, that medical men would and should entrust this work to the pharmacist, the certainty being that it would be better performed and the busy practitioner saved the fatigue and the worry that it entails, still I hardly think that, under present circumstances, we must look for any very immediate increase in that direction. The tendency, however, on the part of the established general practitioner, as it is the custom of the physician, is, I would fain hope, towards a relinquishing, as far as practicable, of this work to us—either in the usual way of giving prescriptions to their patients, or where for reasons this may not be convenient, in the pharmacist undertaking the whole of the dispensing which had previously been done by the medical man himself or by his dispenser. The *Lancet*, I see, in alluding to this matter the other day, suggested that this tendency should be encouraged. This is what it said:—"A departure from the usual method would, they (the dispensing practitioners) believe, imply a loss of income. These are doubtless matters of consequence to practical men. We are of opinion, however, that the change to which they demur would not, even in an economic sense, be as unprofitable as they think. The fact that practitioners in other countries not more favoured than our own are content to forego the work of dispensing is an argument in favour of this view. It is probable, therefore, that an extension of the prescriptive method would not entail such difficulties to the practitioner as some expect. If assisted by moderate charges on the part of chemists, it would not unduly tax a patient's means."

But however this may be, the pharmacist's vocation is not by any means as yet at an end. There is room, and always in my opinion will be room for him, unless he degenerate. The physician is more and more dependent upon him for the purity and uniformity in strength of the many potent remedies he employs; he looks to him often for scientific help, often for the carrying out of suggestions he may make, or it may be of investigations he requires to be undertaken, while the public increasingly rely upon and respect him. But his calling is, and must be, a personal one. He will not delegate to others outside his own pharmacy—except where the necessity is absolute—the manufacture of the various galenicals he dispenses, nor will he be dependent on others for the more special work of seeing that where substances or preparations of a standard strength are employed, these are invariably of the nature and definiteness prescribed. As Professor Leech says, "If pharmacy is to hold its own, each pharmacist must be in the future the guarantor of the medicines he dispenses, not the mere distributor." And further, "of this I am quite convinced, the rise of pharmacy to a higher estate or its fall to a lower depends on whether what I may call its more scientific functions are accepted or declined."

In addition, however, to the important duties—general and special duties—appertaining to the pharmacist, there is lying before us a wide field of scientific work, which as yet but the few in pharmacy have attempted in any degree to cover. It is in this direction, if the limits of pharmacy be too narrow, that we must look for increased occupation, increased usefulness and increased remuneration. There is general analytical work always open to us; then there is electricity, to which from time to time we are advised to turn some of our attention; but, in fact, any work of a scientific character, more or less allied to our calling, for which there is, or for which in the future there may arise a demand, might be undertaken—and why should it not be?—by the trained and skilled pharmacist. Dr. Tilden, if I may quote him once more, says in reference to this, "Who so well fitted as the pharmacist, by his special training, to become the public adviser upon all questions connected with sanitary affairs, to investigate cases of poisoning or adulteration? What is there to prevent him from in time supplanting the half-informed medical officer of health, or the too often incompetent public analyst?" I ought perhaps to add that these remarks were made some nine years or so ago, and it is unquestionable that a great advance has been made in the qualifications of public officers since that time. However, this does not in the least invalidate or weaken Dr. Tilden's then contention that these possibilities are within reach of the pharmacist, and that his aim should be to equip himself to take advantage of them. Doubtless there will be some difficulties in our way, but "difficulties," it should ever be remembered, "only exist to be overcome." "Difficult things, in fact, are the only things worth doing, and they are done by a determined will and a strong hand. In the world of action will is power; persistent will, with circumstances not altogether unfavourable, is victory; nay, in the face of circumstances altogether unfavourable, persistency will carve out a way to unexpected success."

But if, gentlemen, it shall be our intention as pharmacists to occupy this advanced position, or even if we content ourselves with a lower place, it will be equally important that the training for our work be

thorough and complete. Whatever may have sufficed in the past, depend upon it that no haphazard method of gaining our qualification will suffice for the future. The Council of the Pharmaceutical Society, the body upon which rests the responsibility of providing an adequate supply of capable pharmacists, has long seen the necessity for an organized system of education for her would-be diplomates. It is admitted by all who are qualified to form an opinion that though many thoroughly competent men year by year pass the examinations, yet that more in proportion gain the requisite knowledge for the examination room in the shortest possible time—the certainty being that knowledge so acquired cannot be lasting, and consequently of no permanent benefit either to the pharmacist or the public. It is to remedy this that the Council has attempted to carry through Parliament its so-called Curriculum Bill. This is a measure, as you are aware, to enable the Council, in the way they may think most desirable, and the best calculated to achieve the end in view, to make provision for a definite course of training for pharmacists. Though it is not specified in the Bill, we have had a foreshadowing of what this scheme of education is likely to be. Briefly it is to compel the passing of a Preliminary examination before apprenticeship, an intermediate examination at the end of apprenticeship, attendance at definite courses of lectures at a school or college recognized by the Council, a course of instruction in practical chemistry, and a final examination a year after the passing of the intermediate one. My able predecessor in this chair, as will be in the recollection of you all, formulated, a couple of years ago, an alternative scheme of education, which he thought, and which I at the time thought, would be more practicable than the one suggested by the Council. Its conspicuous merit lies in the fact that it provides for a continuous interest in the work of preparation from almost the first day of pupilage right on to the time of examination. But in other respects it is not perhaps quite so satisfactory. For instance, the multiplicity of teachers it would employ, though doubtless fairly capable up to a certain standard, are not likely to be, under the arrangement Mr. Barclay proposes, men of the distinction in their various subjects to whom I fancy we should prefer to entrust so important and responsible a work. Then there would be the difficulty of establishing, and equally equipping the laboratories that would be required for practical chemistry, and this would be more particularly felt if, as I hope will be the case, the Council endeavour to make provision for advanced practical work in chemistry, especially organic chemistry, such as would be required by the student to fit himself for the highest requirements of his professional position. Whatever scheme may however be finally decided upon, the Council will I am sure receive the support and assistance of all well wishers of pharmacy in its efforts to extend the qualification, and consequently to raise the status of the pharmacist.

Now, as very materially affecting the after career of a student, the advantages of a sound and advanced scholastic education cannot be over estimated. It has been said, and is doubtless true, "that what many pharmacists have needed to convert an unsuccessful career into a satisfactory and a comfortable one was a closer acquaintance with the first four books of Euclid." Professor Hillhouse in his address at the opening of this College, Professor Tilden at Bath, and others have all the same tale to tell of the loss entailed and the impossibility in many cases of making but the most meagre progress consequent upon this defective preliminary education. I should like, I must confess, to see our own Preliminary examination much enlarged in scope. An examination similar to the now London University matriculation examination would inevitably eliminate the "dolts by manufacture," of whom, according to Professor Hillhouse, there are not a few, and would ensure that in those who were capable of passing it we had material out of which a scientific pharmacist could, with adequate training, be developed.

But no amount of school or college training must be allowed to supersede—as has been suggested in some quarters—the necessity of serving an apprenticeship of several years duration in an open pharmacy. There is no doubt this period of apprenticeship is frequently not utilized to the best advantage in view of what will be required of the pupil at a subsequent stage of his career. Often, indeed, it is to a large extent a period of wasted time and wasted energies, resulting not infrequently in the production of incompetent individuals, who are the "bane" of pharmacy, and who by their ignorance and incapacity too often degrade it in their after life. Nevertheless, in an apprenticeship faithfully served, and as loyally recognized by the master, the habits formed, and the general experience gained during this probationary period are indispensable, and there can be no efficient substitute. It is a period however that should be utilized to the full. In particular, advantage should be taken of the various classes that may exist in the locality for the acquisition of as large a store of scientific knowledge as is obtainable, the student being taught to regard this as the best possible equipment for the battle in which, sooner or later, he will have to engage.

With this period of apprenticeship thus profitably employed, and the systematic teaching—the "true gold"—which the student will subsequently receive, it will only remain for the examination to put, if he merit it, the stamp upon his qualifications. As to the qualifying—the Minor—examination, I would extend this so as to include in the subjects of chemistry, materia medica and botany, what is now only demanded from Major candidates; for whatever may be the opinion as to those who pass the present Minor examination, of this I feel sure, that granted they may be qualified sufficiently for the public safety, nothing short of the attainments now required of Major candidates will in the future be a sufficient protection for themselves.

The Major examination I would considerably enlarge, so that those who complied with its necessarily advanced requirements would be qualified to discharge the higher functions to which I have alluded.

Objections, I know, will be urged against these suggestions, as they are urged against the proposals of the Pharmaceutical Council, on the ground that the increased educational demands, and the expenditure of time and money necessitated, would have no corresponding advantages, and ensure no adequate return. I do not share such a view. Pharmacy will not always remain in its present harassed and depressed condition; sooner or later it will emerge chastened and strengthened by the trials to which it has been exposed; but if it is to have a future—a future of progress and prosperity for which we yearn—it must, I am convinced, be built upon the basis of a sound and extended scientific education, for on any other foundation its structure will be unsatisfactory and insecure.

Professor Hillhouse proposed a vote of thanks to the President for his admirable address. He said he most sincerely wished that the resolution had fallen into hands that could have dealt with it more satisfactorily than it was possible for a comparative stranger like himself to do; but perhaps, after all, there was a certain amount of fitness in the important and responsible task falling to him. He sincerely trusted that that the first meeting of the Association in the college, augured well for a greater scientific future for the organization than had been the case in the past. He had great pleasure in being able, on

behalf of the gentlemen of that college over whom he presided, to offer the members of the Association a most hearty welcome, and to express for them the hope that the Association might grow and prosper. It so happened that he was responsible for the general control of the educational arrangements of that college, and it was perhaps not out of place that one who held the position of President of Mason College should have an opportunity of complimenting the President of the Chemists' Association on his address, with which he most heartily agreed. He sympathized very keenly with pharmacists, and was well acquainted with the difficulties of their calling at the present time; but he thought the public needed more sympathy even than the pharmacists, who could take care of themselves. For the public, however, there was no help; they were at the mercy of anyone who, as indicated by the President, chose to set up in business and administer drugs without the necessary qualification. In this way the public were to be pitied even more than the pharmacists themselves. They had no escape, and were bound to drink what was given to them. He urged that legal restraint should be put upon those who exercised the calling of pharmacists without being properly qualified. He did not, however, think English pharmacists would like to be hampered with the restrictions which were placed upon those of their profession in Germany by the Government of that country. There the price of medicine was regulated by the Government, and the pharmacists had a definite pecuniary status. Neither could the pharmacist in their country open stores *ad libitum* as in England. Here they had only got to see a shop, stock it, and begin to dispense; but in Germany and Switzerland, he was not sure about France, they could only take an existing business in a town, and only increase the number of pharmacists' shops in proportion as the population of the country increased. Consequently competition was not nearly so keen. Another evil which he considered to be as great as any was the practice which had sprung up of late years of prescribing for the medical profession rather than by the profession. He meant by that, the puffing up by chemists to the medical practitioner of certain compounds and drugs, and making him believe that those were the best things for him to prescribe, rather than prescribe himself. The making, too, of the unofficial preparations was a most serious item, because it militated against the use of fresh drugs, whilst, in his opinion, it was desirable that no too old drugs should be used. If unofficial formulæ were extended more it would tend to complicate the pharmacist's difficulty. He quite endorsed the opinion of the President as to the only possible future for pharmacists. They must drop the store and develop the scientific side of the business, because in the former they had to compete with all classes of people who took up the selling of drugs as an adjunct. If not dropped and the scientific side taken up, the last stage of the pharmacist would be worse than the first. To accomplish this end they would have to make sacrifices for some time, but if they did so they would have a brighter future than even the President had prophesied for them.

Councellor Barclay seconded the motion. He congratulated the President on his address and also on the fact that he was the first who had presided over the meeting of the Association in the Mason College. He considered the adoption of their new quarters was the beginning of a brighter future for the Society. There were several interesting points in the address to which they had just listened. One of the objects advocated was raising of the status of the profession, and another point was that the public had no protection against the supplying of goods by unqualified men. The Pharmaceutical Society would have the sympathy of both medical men and the public if they would see into these things. But they were in fact too cowardly in the matter. He referred to the scheme of education which he formulated about a couple of years ago as being likely to make students of pharmacy take greater interest in their business than was now the case, and which was likely to lead to their ultimate success. His system was that young men engaging in the business of pharmacy should be put to their studies from the very commencement of their apprenticeship, instead of being made to do work for several years which was of not the slightest use for them.

Mr. Pullen, Leamington, specially remarked upon the want of interest shown by apprentices in the business, and said a great deal of their lack of prosperity in after life was owing to this cause. Men who merely wished to get through the day, without caring for or showing an interest in their work, could not be expected to make progress.

Mr. Southall considered hardly enough had been said about the Preliminary examinations, which he thought were quite stiff enough. He considered if Mr. Barclay's educational system were adopted it would be a great help to the students.

Mr. Haydon said the Pharmaceutical Society had contested the question of the individual liability of those composing companies, but it had not contested the point as to whether companies could trade without employing qualified men. There were companies in that town which kept shops, who did not employ qualified managers. This was a matter which certainly ought to be contested.

The motion was then put to the meeting and carried.

The President in reply thanked the members for their kind attention, and for their vote of thanks. He especially thanked Professor Hillhouse for his presence there that evening, and for the assistance which he and Professor Tilden were always ready and willing to give them. It was gratifying to him (the President), that Professor Hillhouse, looking on from the outside, should take the same view of the future of pharmacists as himself. In Professor Hillhouse's opinion, there was no other future for pharmacy except in a scientific direction. With regard to Mr. Barclay's scheme, it was exceedingly good so far as it went, but still something would be needed if we were to have a body of pharmacists equipped as he (the President) desired. Nothing short of a course of teaching at a college well-manned for the work would in his opinion, be adequate. After expressing his agreement with Mr. Pullen as to lack of interest being at the bottom of much of the non-success, he further referred to the necessity for more union amongst pharmacists, mentioning that Mr. Carteighe had called pointed attention to this in his remarks the other evening at the meeting of the Chemists' Assistants' Association. If they could have more "banding together," and a more loyal support of the Pharmaceutical Council, they might accomplish much.

The proceedings then terminated.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held at 103, Great Russell Street, on Thursday, October 18, at nine o'clock, Mr. E. J. Millard, President, in the chair.

The minutes of the previous meeting having been read and confirmed, the President called on Mr. T. A. Ellwood to read his paper entitled :—

Gum Arabic and its Substitutes.

BY T. A. ELLWOOD, A.I.C., F.C.S.

The present scarcity of gum arabic, and its consequent high price, as well as its relative inferior

quality, has led me to conduct these investigations, in order to ascertain how far the numerous substitutes that are constantly being thrust upon the notice of chemists fulfil the requirements of a good gum. It is an oft quoted saying that "Demand creates supply;" but this is not always the case, as we can easily prove with respect to gum arabic. We cannot force nature to give an abundant increase of its resources, beyond the general average, and neither can we compel the disinterested to cultivate specially for our needs. If then the extensive demand for gum arabic cannot be supplied, because either the natural sources fail, or the natives neglect the cultivation of the plant, or the collection of the gum, we must turn our attention to the obtaining it from other sources. If this should prove a futile attempt, we must say, "Is there nothing yet in commerce that will supply its place?" "Nothing that nature produces in districts more accessible?" These questions have been asked and answered in the affirmative, and to such an extent that owing to the numerous substitutes thrust upon us, we are at a loss to decide upon the one that is best adapted to replace a worthy, well and long tried article, the scarcity of which we must all regret.

Whilst nature is yielding her substitutes, scientists are not idle in their endeavour to produce a substance artificially that will replace the natural product, and thus again prove that "science vies with nature to supply our needs." This self-allotted task is by no means easy of accomplishment; to give to a manufactured product the characters and properties of a complex organic drug, requires a close application to and careful study of science and art, as well as an intimate acquaintance with the ideal article itself.

Labour, with such an object in view is, however, worthy of engaging attention, and happy is the man who reaps his reward in success.

It is my intention to-night briefly to refer to both methods of production, namely, the natural and the artificial, and to give you the results I have obtained in conducting a few experiments with the various substances already introduced, or about to be introduced, into the commercial world, as possessing the necessary qualities to make them useful in cases where gum is principally used at present.

I must first make a brief reference to gum arabic itself, as we must know the nature of the drug for which we contend, and which has proved its superior value as a commodity in the arts to such an extent that it is worthy of imitation. One criterion of a good article is its numerous imitations.

Gum arabic has been now used by man for several thousand years, on account of its mucilaginous nature, civilized and barbarous nations alike resorting to it for such purposes. It will therefore be hard to convince humanity that another substance is its superior or even equal, and can replace it; and it will have to be a very superior article that will stamp out the use of so firm a friend as acacia, or even to replace it, in so marked a degree as to render its present supply more than adequate for the purposes for which it is used.

Gum arabic must now be understood as a name of very wide meaning, embracing a great many kinds of gums, the sources of which, even in this enlightened period, are not accurately identified. Dr. Squibb suggests that the term arabic should be regarded as a generic name, whilst acacia is reserved as a specific name, properly applied to that kind of gum arabic used in medicine.

The source of gum arabic is various species of acacia, such as *Acacia vera*, which Dr. Cooke, in his "Handbook on Gums and Resins in the Indian Museum," declares to be the source of the best variety. *Acacia arabica* was supposed to be the original source, and it was from this variety the name arabic was taken. This plant is still one of the chief Indian sources. *Acacia Verek*, *A. Senegal*, the latter now admitted as official in the British Pharmacopœia, and several other varieties of acacia, are each contended for by different writers.

The best gum is collected by the Somalis in Eastern Africa. Long incisions are made into the bark of both stem and branches, the juice quickly exudes, and after a few days has dried hard enough to be collected. It is then picked off, and packed in goatskins and shipped from Berbera to Aden and the various ports of India, where it goes by the name of Berbera gum.

The whole of the north-eastern districts of Africa yield varieties of gum arabic, the quality of which varies in an enormous degree, according to the plants from which they are collected, and the care observed in picking them. They are most of them shipped from the various ports of the Mediterranean, and thus derive their commercial names, Turkey, Alexandrian or Smyrna gums.

Gum arabic is said to be formed from the contents of the cells, and not by the metamorphosis of the cellulose of the cell-walls, as in the case of tragacanth; this idea is confirmed by a microscopical examination, proving the absence of cellular structures, which would most likely be present if it were formed by the cells merely undergoing metamorphosis.

Gum, as collected and transmitted by the collectors to the different sea ports, is very mixed, and of various shades of colour; but this in the hands of the picker soon becomes sorted into its different qualities. The picking is most of it done before being shipped; at Trieste especially does it form a very important industry. The present edition of the Pharmacopœia is not so particular as its predecessor in choosing the finest picked white pieces; and it is a fortunate circumstance such is the case, considering that white gum is so very rare.

The uses to which gum is applied extends far beyond either wholesale or retail pharmacy, and hence arises the necessity of providing a substitute for those outside our profession. Besides being used for mucilaginous purposes, it is employed as a medium for colours in calico printing, for giving lustre and brilliancy by manufacturers of silk and crape, in hat factories, in making lozenges, especially those used medicinally, and in high class confectionery generally.

Medicine, which stands first in the necessity for an article that is quite pure and that may be relied upon to give similar results wherever it is used, chiefly employs gum as a vehicle for other potent remedies, as an emulsifier, suspender, diluent, demulcent, and as an aliment of the simplest and blandest kind.

The composition of gum is so well known to you all that I need not encroach upon your time by repeating it here; but will pass at once to its various adulterations.

Inferior Gums.—These can be easily observed when mixed with the true gum in tears by their very different appearance, being usually of a darker colour, of a tougher nature, and in irregular pieces. It is, however, a difficult matter to detect them when in powder; as a general rule, however, they are not nearly so soluble. But I must here mention that in order to powder gum itself, it is necessary to dry it; that is, it requires much of the water of constitution driven off; this effects to a large degree a difference in its character and a change in its properties, after which it is not entirely soluble in water, and its mucilage, instead of being clear and transparent, as when made with picked gum, is of a turbid opaque, or only translucent appearance. Adulterated gums make a still worse mucilage, which has a ropy appearance, and will even after straining deposit a thick, dirty-looking sediment of a viscous nature that will not dissolve on shaking; the solution too will quickly ferment.

Flour.—This is occasionally found as an adulteration in the powdered gum; but it is so easily detected, that we may express surprise at its use as an adulterant, for,

as a general rule, adulterators are keen people. I have lately examined a commercial sample of gum arabic containing as much as 25 per cent. of flour. The granules were easily distinguished by means of the microscope as those of wheat. It was but approximately estimated by the amount insoluble in cold water, the soluble portion being filtered off, and the residue dried and weighed. Powdered gum, therefore, whose decoction gives a blue coloration with iodine, when cold, should be immediately rejected.

Dextrin or British gum is another adulterant, and a more frequent one than the preceding, owing to its solubility in water forming a mucilaginous solution. It is not so readily detected if it is pure enough not to give the starch reaction; but it reduces Fehling's solution much more readily and with a more copious precipitate of cuprous oxide than does gum.

I have here a sample of so-called gum which contains dextrin in a considerable amount, and gives, too, a slight starch reaction. It was given to me by a dispenser who suspected it, because he found that it would not form an emulsion that was at all elegant in appearance, being of a bad colour and soon separating. You will observe that it is dirty-looking, and to the touch is very different to gum arabic of good quality. It gave a very copious precipitate with alkaline cupric tartrate. I therefore, on finding this to be the case, employed a test recommended by Dr. Hager, with the inference that dextrin was there in abundance. The following is the test. The reagent, composed of a mixture of ferric chloride solution, potassium ferrocyanide and dilute hydrochloric acid, is added to a little 20 per cent. solution of the suspected gum, when, if pure, a clear yellow viscous liquid is formed, which remains unaltered several hours; but if dextrin is present the yellow colour changes either at once, or in the course of an hour, and after two or three hours acquires a distinct blue coloration.

I have not yet found gum arabic in tears, however small, to be adulterated with dextrin granules, though such an adulteration has been practised.

Gelatine.—This is a peculiar substance with which to adulterate gum, and one which I think is not much used. A sample I had brought before my notice some time ago was adulterated with 15 per cent. of gelatine carefully prepared in little rounded pieces made to resemble tears of gum, and which in a sample of sorts would, as did this, easily pass unobserved by anyone not on the *qui vive* for suspicious articles. This would, however, soon be detected when endeavouring to make a mucilage, owing to its insolubility in cold water. Such adulterations prove the great necessity of all of us possessing a fair knowledge of materia medica before being actually qualified for business; and still more the necessity of keeping up and applying the knowledge gained in every-day observation. "A little knowledge well applied is of more value than a whole library of dusty books."

Natural Substitutes.

Of these I need say but very little, as a paper has already appeared in the *Pharmaceutical Journal*, April 14, 1888, dealing with the chief of these, that are now in commerce, namely, glassy amrad, East Indian amrad, pale amrad, oomra whatti and ghatti. I have on the table samples of amrad, East Indian and ghatti. Of these the latter is by far the best adapted to supply the place of gum acacia, as it will form a very adhesive mucilage, stronger than that from ordinary gum. Emulsions made with it are quite white, permanent, and equal in all respects to those made from picked gum. I find that the best proportions for making a mucilage of this gum having about the same viscosity as acacia mucilage, is to double the amount of water ordered officially for the preparation of the latter. Thus: Dissolve 3 parts of ghatti in 8 parts of distilled water.

Another gum used in India by dyers and calico-printers as a vehicle for colours, and which might with advantage be introduced into England for that purpose, is one obtained from *Angeissus latifolia*, which with the natives goes by the name of dhaura, and by them is considered to be superior to gum arabic, such as they obtain from *Acacia arabica*. It is in high repute amongst the calico-printers of Lucknow, its chief use with them being for dying with turmeric, although they still prefer gum arabic in combination with madder. Dr. Watts, in the 'Economic Products of India,' describes it as occurring in "clean straw-coloured elongated masses, sometimes honey-coloured or even brown, from impurities, nearly always mixed with bark of the tree, sand and other impurities, and brown tears probably derived from other sources." As an adhesive gum it is inferior to gum arabic. Its impurities, and the fact that it contains tannin, excludes its use from pharmacy. It might nevertheless still be used in place of gum arabic in the arts, especially as it is superior for such purposes to British gum.

Artificial Substitutes.

There are several of these that will no doubt gain a commercial reputation, and most assuredly will be largely used to replace gum for purposes outside pharmacy; but to us as chemists it remains to ascertain how far our wants can be supplied, and to what extent we may employ artificial preparations. It will be required of them, that they shall be chemically pure, contain no injurious ingredient, not liable to quick decomposition, easily soluble in cold water, compatible with the commoner drugs dispensed with them, pulverizable when necessary without undergoing change of properties, have no injurious therapeutical action, besides possessing several other recommendations, before conservative pharmacists will employ them in their business, and before they will be allowed to be used "By Authority."

Science however never says fail, and "what is an impossibility to-day, becomes an accomplished fact to-morrow," either by ardent study, or a lucky blunder.

Of these artificial substitutes, I have been able to investigate but two, and will now give my opinion of their relative value, based upon the general knowledge I have gained from these experiments, and from what has been furnished me by the inventors.

Algin.—This substance, which was discovered several years ago by Stanford, deserves a prominent position amongst the artificial substitutes for acacia, and it only needs to be more fully known in order to supply the place of gum to a very considerable degree. But so far as its use pharmaceutically goes, I am somewhat disappointed in my results. In other respects, however, it can so largely replace gum arabic that it will permit of the latter being more confined to use in pharmacy.

Algin is a constituent of many species of algæ. It is obtained from them as follows:—Wash out all the soluble salts with fresh water, these being reserved for the manufacture of iodine, algin remaining insoluble. The residue is then macerated in a cold solution of normal carbonate of soda for twenty-four hours, in order that it may become thoroughly disintegrated and form a salt with the sodium, which is now soluble in cold water; the result is a gelatinous mass, which may be heated gently to make a solution of the algin; the mixture must then be strained, diluting it, if necessary, to prevent it again gelatinizing.

The strained solution contains besides the algin, the other natural constituents of the algæ not previously removed by washing, such as mucilage and dextrin. On the addition of hydrochloric or sulphuric acid, alginic acid is thrown down by a decomposition of the sodium salt. This is then bleached in the ordinary way and pressed into sheets or cakes. This peculiar organic acid will form salts with most of the metals.

It is made into the ordinary algin-gelatinous sheets, by digesting in a solution of sodium normal carbonate, evaporating to a thick viscid liquid, and painting upon warm plates to dry and scale in the usual manner employed for other scale compounds.

Other sorts of alginic acid are made in a similar way.

Stanford, in a paper before the Society of Chemical Industry, describing the various algins, gives the following as the formula of the sodium salt.

$Na_5C_{76}H_{77}N_2O_{22}$. This salt possesses a feeble acid reaction, and hence it may be assumed that a neutral salt would require six of the sodium in combination with this complicated acidulous radicle.

The ultimate analysis of alginic acid proves the following percentage composition:—

C	44·39
H	5·47
N	3·77
O	46·37
	100·

The relative proximate analysis of algin, gum arabic and tragacanth is as follows:—

Algin.

Water	17·13
Alginic acid	67·58
Sodium	10·71
Alkaline salts	2·98
Chalk	1·
Aluminium, etc.	·6
	100·00

Gum Arabic.

Water	17·6
Arabin	70·4
Alkaline and earthy matter	12·
	100·

Gum Tragacanth.

Water	11·0
Arabin	53·3
Bassorin	33·3
Alkaline and earthy salts	2·4
	100·

The algins recommended as substitutes for gum arabic, pharmaceutically and for other purposes, are the sodium and ammonium alginates, which are easily made from the insoluble alginic acid by neutralizing with the respective carbonates, as before detailed. These two alginates are readily soluble in hot water, and, after some time, completely soluble in cold water, forming a gelatinous mucilage, that from the ammonium salt being much darker in colour.

I have found that in making a mucilage for ordinary purposes, and one possessing a viscosity exceeding that of acacia, 12 grains of the algin dissolved in an ounce of cold distilled water is quite sufficient. If much beyond these quantities are used, instead of a mucilage, a jelly is the result. The *sodium algin* mucilage possesses a very faint saline taste, is bright in colour, perfectly transparent, and free from odour. The *ammonium algin* mucilage is not so satisfactory. It is very dark in colour, quite brown, not quite transparent, and possesses a distinct saline taste which makes it somewhat objectionable; it is free from odour.

These mucilages more closely resemble pectin than acacia in their viscosity and general characters. One great drawback to their use in medicine is their incompatibility with so many of the salts and the mineral acids. They are incompatible with hydrochloric and sulphuric acids, alcohol, the salts of calcium, bismuth, iron, copper and lead.

(*To be concluded.*)

Reviews.

MODERN THEORIES OF CHEMISTRY. By Dr. LOTHAR MEYER. Translated from the 5th German edition by P. P. BEDSON and W. CARLETON WILLIAMS. London: Longmans, 1888.

This book is a record of the development of the atomic theory in chemistry. As such it has long been known to chemical students in its German form, and in fact has been, and still is, the most complete and accurate work on the subject. Professors Bedson and Williams were therefore well advised in undertaking to translate it into English, and they deserve the gratitude of all English students of the science. It must not be supposed that the work is descriptive only, since it is interspersed with criticisms and suggestions which are, in themselves, of the highest value. Thus the "Introduction to the First Edition" contains a succinct and critical account of the only attempt that has ever been made by a chemist to construct a general theory of the science, which shall be to chemistry what the laws of Kepler and Newton are to astronomy Berthollet's great work, the "Essai de Statique Chemique," in which he gave this theory to the world, is a book of which the modern student knows but little more than the name. It was a deliberate attempt to show that chemical affinity is only a phase of gravitation, and it looked forward to the time when it would be possible by means of this theory to predict the result of every chemical interaction. Berthollet, a man of profound philosophic insight, was fully sensible that such a theory could not be developed until the influence of all the conditions of a chemical phenomena were fully known. He therefore advocated, as the work of the chemist of the future, the complete study of some of the simplest chemical actions, such, for example, as the influence of time, temperature, mass, and other conditions on the reaction between zinc and sulphuric acid. But chemists ignored his counsels, and proceeded to enlarge the domain of the science by the discovery of new substances and new reactions, none of which were exhaustively studied; even at the present time very few chemical changes have been minutely investigated. Berthollet's great work "stands in the midst of our immensely extended literature like a lost landmark, to many perhaps unknown, studied by few, completed and perfected by none." Dr. Lothar Meyer justly observes that chemists cannot be blamed for the adverse view they took, a view which at the time received support from the obvious inadequacy of several of Berthollet's premature and somewhat hasty generalizations. His so-called "law of chemical action" asserted that the proportion of any one constituent in a chemical compound was dependent upon the amount of that constituent which was allowed to take part in the formative reaction of the compound. This statement was soon seen to be at variance with the established fact of definite combining weights. Dalton's atomic hypothesis gave the death-blow to Berthollet's theory, and chemists thenceforth devoted themselves to the confirmation of Dalton's hypothesis, which in its turn proved to be a valuable aid to discovery. Sooner or later, however, the work planned by Berthollet must be done; already chemists have begun to turn their attention to the study of the effects exerted on chemical change by various conditions, in fact to determine the influence of the physical environment. Reference is made to some of these investigations in Chapter XIII. of Part III.

The first part of the book is occupied with that extension of the atomic theory which was mainly the result of attempts to determine atomic weights. The hypothesis of Avogadro, the law of Dulong and Petit, Mitscherlich's law of isomorphism, are separately con-

sidered, and their application to the determination of atomic weights is discussed. Then follows, as a conclusion to the chapter, an exhaustive account of the periodic law. To Dr. Lothar Meyer belongs the merit of having been one of the first to recognize the importance of, and draw public attention to, Mendelejeff's generalization, which without doubt is destined to play a very prominent part in the chemistry of the future.

The second part of the book is entitled "The Statics of the Atoms," and deals principally with the construction and uses of chemical formulæ, from the type of Gerhardt, which was rendered possible through Liebig's conception of the "compound radical," to the much more definite "structural" formulæ of Kekulé. The exact significance which should be attached to these structural formulæ is one of the most debated points in modern chemistry. Many English chemists adhere to the original view of Gerhardt, that they are merely "diagrams" or "symbols" of reactions, which summarize the chemical habitudes, the formative and transformative reactions of chemical compounds, and do not, however much they may be developed, afford any delineation of the actual arrangement of the atoms in the molecule. On the other hand, some of the most eminent of German chemists have not hesitated to assert that even in their present and admittedly imperfect form, structural formulæ convey some information as to the relative position of the atoms, and that if it were possible to construct them in space of three dimensions they would present veritable pictures of molecules. An attempt to devise these three-dimensional formulæ has been made of late years and is now on its trial. Dr. Lothar Meyer is evidently of opinion that the theory of van't Hoff has not yet found a sufficiently firm footing in the science to deserve discussion in this volume. Judging from the results of work which has recently been carried on in order to prove or disprove the correctness of this theory, we may safely venture to predict that its discussion will occupy no inconsiderable portion of a future edition of this book. Should the validity of this theory be established, chemists will be driven to recognize that structural formulæ imply much more than Gerhardt ever dreamed of.

In this part of the book also another problem is noticed which has lately attracted much attention, viz., the determination of the molecular weight of solid substances which do not volatilize without decomposition, and which therefore do not come under the domain of Avogadro's hypothesis. It has been proposed to use for the purpose a method which was suggested some years ago by Raoult. The method is dependent on the depression of the freezing point of water and other liquids consequent on the solution of various salts in them. The extent of this depression appears to bear some direct relation to the molecular weight of the dissolved salt. Quite recently, Victor Meyer and his pupils have applied this method to the determination of the molecular weight of a large number of inorganic and organic compounds. It is, however, still open to doubt to what extent this method affords information as to the molecular weight of the *solid*, since whatever may be the condition of a substance dissolved in a liquid, it is certainly no longer in the solid state, and until we know more about the nature of solution and about the action of a solvent, it does not appear that much reliance is to be placed on this method of determining the molecular weight of solid. In Chapter IX. of the same part the subject of Valency is very fully and fairly discussed. In the present state of our knowledge it seems hopeless to attempt to reconcile the divergent views of chemists on this vexed subject. A deadlock has been reached, and new light can only come with much more extensive and accurate knowledge of the chemical and physical behaviour of various compounds, particularly those which are usually denominated "molecular." It is probable that no satisfactory conclusion will be reached until we know more of the physical, that is the dynamical aspect, of chemical action.

The physical side of chemical phenomena, to which more attention is now being paid than has formerly been the custom, is considered in Part III., under the title of the "Dynamics of the Atoms." The work of Thomsen and Berthelot with reference to the amount of heat evolved and absorbed during chemical interaction is considered and criticized in Chapter XII. Very little can yet be safely inferred from the enormous number of data which has been accumulated by these workers. It must be clearly recognized that these thermal phenomena are the result of several distinct and varying factors, some positive, others negative, and that until some means have been found of differentiating and separating them the data are of comparatively little value for the purposes of generalization.

Chapter XIII. is a record of the experimental investigations of the "mass-actions" which were first recognized and studied by Berthollet. The theory of Guldberg and Waage represents a distinct advance towards an explanation of one of the most potent factors in chemical change. Chapter XV. contains an excellent summary of the investigations which have been conducted in the hope of determining the nature of the relation which exists between chemical and electrical phenomena. No department of physics is likely to throw more light on the nature of chemical action than electricity. It is satisfactory to observe that a coalition has recently been brought about between chemists and electricians with the object of affording mutual help in the investigation of those changes, which obviously present an electrical as well as a chemical aspect.

Sufficient has now been said to give some idea of the wide range of the subjects which are considered in this book. No chemical student, who knows his business, will fail to make himself master of its contents as soon as he has once got beyond the threshold of the science. The translation has been effectively done. Though the plan of the book is "durch und durch Deutsch," but small traces of the characteristic grammatical construction of the original are to be found in the English edition. There is no index, but an unusually full and excellent table of contents, so full indeed is it that in one place, in the contents of Chapter VIII., Part II., a reference is given to Raoult's observations on the depression of the freezing point, the counterpart of which does not apparently exist in the text.

HANDY BOOK OF MEDICINE STAMP DUTY, with the Statutes and Appendices. BY E. N. ALPE.*

This book, although not avowedly an official exposition of the Acts relating to medicine stamps, is put forward as the work of an official who has had long experience in the department entrusted with the application of the law on this subject, and might therefore be expected by a purchaser to furnish trustworthy information, not only as to the actual statutes, but also as to the principles by which the department is guided in interpreting them. And we may say at once that the expectation would not be disappointed; for within the space of a hundred and forty pages may be found compacted more useful and trustworthy information as to the stamping of dutiable medicines than has ever before been available. The book commences with a brief, well written *résumé* of the history of the duty upon medicines, since its first imposition in the year 1783, fuller reference to which is made in another column. This is succeeded by a codification of the existing statutes, or residues of statutes, interspersed

* London: Office of the *Chemist and Druggist*. Crown 8vo. Pp. 1–142. 2*s*. 6*d*.

with a lucid commentary, followed by the schedule appended to the Act of 1812, and interesting annotations upon some of the medicines included therein. The "General Charge of Duty" and "Special Exemptions" are made the subjects of special chapters, which contain, it may be fairly assumed, an exposition of the law in accordance with the views of the legal officers of the Inland Revenue Department. It seems as full and explicit as any general statement upon a rather intricate subject can well be, and if carefully consulted will settle many questions that would in the ordinary way be served up as intellectual exercises for an editor. One thing it demonstrates pretty clearly is that the officials do not arrive at their conclusions as to the liability of a label quite so arbitrarily as has sometimes been asserted; at the same time it is evident that they consider their first business to be the collection of a tax according to what they believe to be the law, and not the justification of any particular piece of legislation. Very possibly accident or "perverse ingenuity" may give rise to forms of labels that are not covered by this exposition, but doubts arising from such are not likely to be settled better than by direct application for an opinion to the Board. Ordinary mortals, however, will find in this book a better means of enabling them to keep within the limits of the law on this point than they ever possessed before. A number of magisterial decisions are quoted and in the appendix will be found a curious "Pharmacopœia Empirica," published in the *Gentleman's Magazine* in 1748, and a list of medicines that are or have been the subjects of letters patent.

Obituary.

Notice has been received of the death of the following:—

On the 17th of October, Mr. William Gilliatt, Chemist and Druggist, Wide Bargate, Boston. Aged 44 years.

On the 20th of October, Mr. Henry Thomas Harwood, Pharmaceutical Chemist, Yeovil. Aged 42 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Poisons Regulations.

Sir,—I have read the letters you have recently published about poison regulations, but I do not think they touch the matter really in dispute between the Privy Council and the Society.

The real question is not whether compulsory poison regulations are good, bad or indifferent, but, is not the Society breaking a morally binding agreement by refusing to issue such regulations?

Many of those who were active in procuring the legislation in 1868 have left us, and their places in the ranks are filled with younger men, who do not know what took place then; therefore I should be glad if someone who can speak with authority would inform us what understanding existed between the Privy Council and the Society when the former supported the Pharmacy Bill. If the Society was pledged to issue compulsory poison regulations, I have confidence in my fellow members that if the facts are put fairly before them they will not refuse to carry out an honourable agreement, although its performance has been long delayed, and whatever their opinions of the value of the regulations may be. If no such agreement existed, then the question of compulsory poison regulations may be fairly discussed on its own merits.

High Street, Notting Hill. W. Pickard.

Poison Regulations.

Sir,—I believe that the two gentlemen who write in opposition to the poison regulations in the Journal of Saturday last are some of those (who no doubt with good intentions) opposed them so thoroughly twenty years ago.

Let us hope that the fact of having then committed themselves to opposition will not be regarded as a good reason for doing so now.

I esteem both gentlemen much, and was then inclined to their opinions, but now find, with many more of my friends, that had these regulations been adopted at the time when they were rejected we could have gone to the Government with clear hands to ask for an amended Pharmacy Act, which would be something more than a dead letter, as the present is.

If we wish to improve our prospects we must be united, and show that we desire to carry out the original Act as then proposed, and we shall have no difficulty in obtaining an amended Act.

St. John's Wood. Arthur Sangster.

Sir,—I quite agree with your correspondent, Mr. W. W. Urwick, that "the trade" ought to resist any regulations of any sort whatsoever for the storing and dispensing of poisons being foisted upon them.

Without knowing what Dr. Symes exactly intends, I take it that the wording of his notice of motion is an insult to the intelligence one has a right to expect in a qualified chemist and druggist—further regulations for the storing and dispensing of poisons, forsooth!

As one of those who moved against this subject eighteen years ago, my maturer experience only confirms the course we then advocated. In my capacity as local secretary I have called upon each member of the trade here—subscribers and non-subscribers—and questioned them as to their feeling on this matter, and without any exception they all expressed themselves most decidedly against the course suggested by Dr. Symes's motion. I commend this plan to other local secretaries, that at any rate the Council may not be led into this proposal in ignorance of the feeling of their constituents.

Altrincham. J. T. Clarke.

Chloride of Ammonium in Neuralgia.

Sir,—A note occurs in "The Month" of a recent issue with reference to the use of chloride of ammonium in neuralgia. The late Dr. Fergus, of Glasgow, was in the habit of ordering that drug, for I should think about eight or ten years before his death; he often spoke to me of the remarkably good results he got, and seemed surprised that so few physicians ordered it. He told me that in treating non-periodic neuralgia he knew nothing to equal chloride of ammonium in doses of 20 to 30 grains.

Glasgow. Robert R. Currie.

W. P.—See an article by Mr. Conroy in the *Pharmaceutical Journal*, 3rd series, vol. xi., p. 933, and another article in vol. xviii, p. 54.

Strophanthus.—The provisions of the Pharmacy Act, 1868, do not extend to the island.

J. J. J.—(1 and 2). The title referred to in these questions is not protected. (3 and 4). These questions, if the supposed contingency arose, could only be decided in a court of law.

R. E. V. John.—Your second letter did not appear to us to contain any material contribution to the subject under discussion.

"*Socius Disputans.*"—The nitrate of potassium decomposes under the influence of heat and the combustion of the paper is simultaneously promoted by the oxidizing action of the products of decomposition.

W. H. Smith.—We believe the trade mark about which you inquire is that of Wood, of Rotherham.

Member.—The *Apotheker-Zeitung* is the organ of the German Pharmaceutical Association and is published in Berlin.

Pyrotechny.—The manufacture of fireworks is very strictly regulated by the Explosives Act, an abstract of which will be found in the Society's Calendar.

Communications, Letters, etc., have been received from Messrs. Shepherd, Hardwick, Smith, Elwood, Edinburghensis, Assistant, Nemo, W. P.

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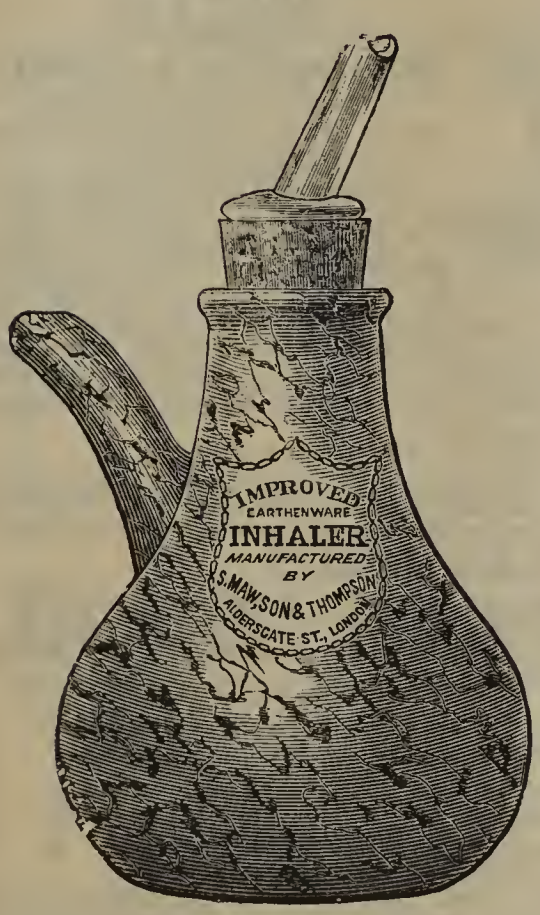

Fig. 8.
MAW'S IMPROVED.

Fig. 6.
MAW'S DOUBLE-VALVED.

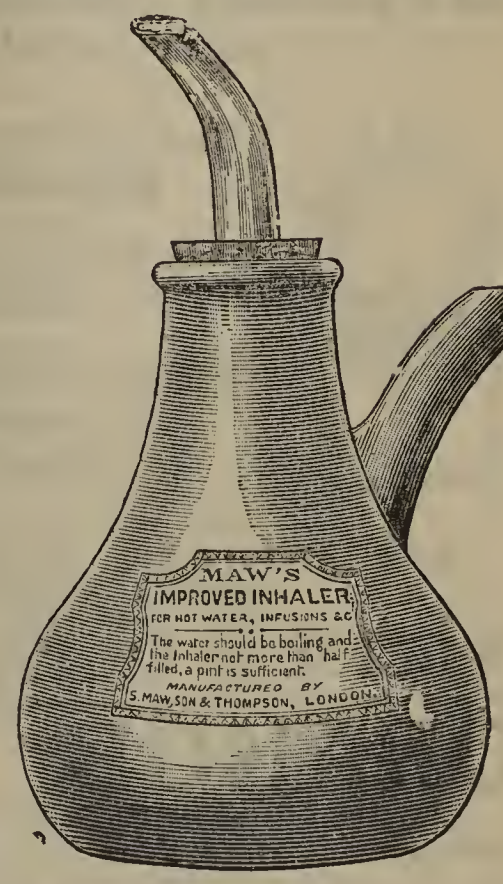

Fig. 8a.
MAW'S IMPROVED.

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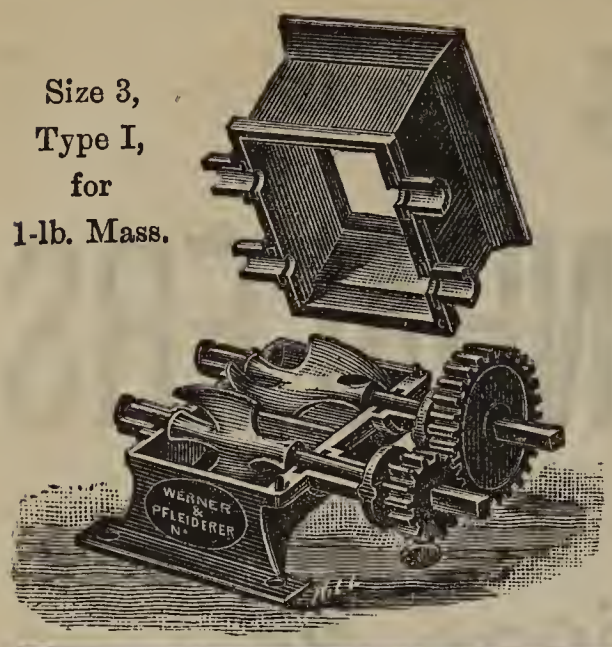

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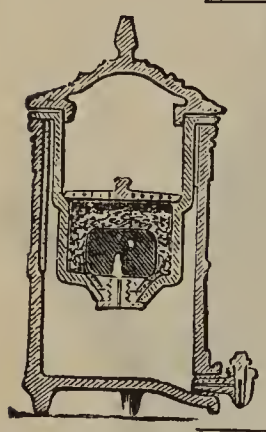

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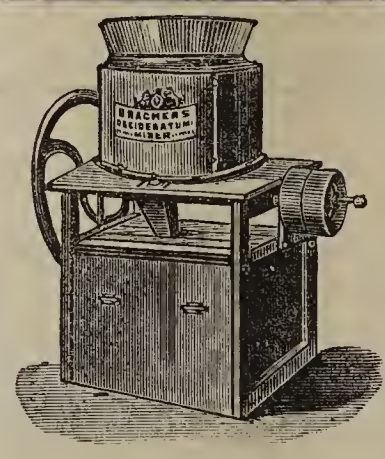

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JUNE, 1888.

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JULY 7th, 1888.

THE CHEMIST & DRUGGIST ... "These New Liquors have HIGHER CLAIMS THAN FOR THEIR MERE CONVENIENCE; their potency is unquestionable, and they provide the element of constancy where that can generally not be ascertained, or even obtained, by the ordinary methods."
DECEMBER 3rd, 1887.

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MAY 26th, 1888.

Fletcher, Fletcher & Stevenson,

North London Chemical Works, Holloway, London, N.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 958.] SATURDAY, NOVEMBER 3, 1888. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

17, BLOOMSBURY SQUARE, LONDON.

An EVENING MEETING of the Society will be held at the Society's House, 17, Bloomsbury Square, London, on Wednesday, November 14th, at half-past Seven.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday next, November 7th, as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society, of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of THREE ANNUITANTS on the Benevolent Fund of this Society will take place on Thursday, the 6th day of December next, at 12 o'clock precisely.

RICHARD BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 3rd, 1888.

For List of Approved Candidates, see Journal, October 20, page ii.

There are at present *forty-nine* annuitants, receiving £1670 per annum, and casual relief is also granted, amounting in 1887 to nearly £500. The total expenditure in 1887 was £2375.

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And to increase in the same proportion.	

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OF THE

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BY PROFESSOR GREEN.

The Lectures are delivered at 9 a.m. on the last two days of each week. The Courses include the Morphology, Anatomy, Physiology and Classification of Plants.

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3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM. JOURN.**" and must be sent only to J. & A. CHURCHILL, 11, New Burlington Street, London, W.

Telegraphic Address, "Churchill, Publishers, London."

N.B.—The Journal is supplied from the publishing office post free to any part of the United Kingdom on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad (excepting India and China), 22*s.*; India and China, *viâ* Brindisi, 24*s.* per annum.

Payment may be made either by **Cash** in a Registered Letter, by **Postal Order**, by **Cheque** crossed London and County Bank, or by **Money Order**, payable at Regent Street, W., to J. & A. CHURCHILL. *Postage Stamps for any amount above Ninepence cannot be received in payment.*

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" " "	Menthol Cones	
" " "	Feeding Bottles	19
" " "	McK. & R. Pills	10
" " "	Quarterly Price Current	6
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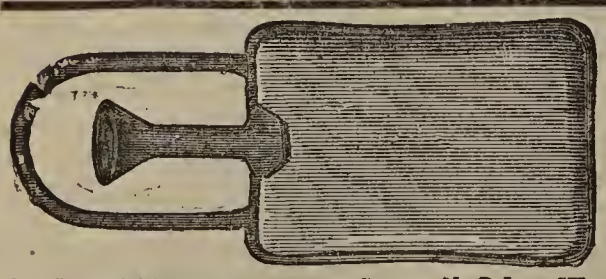

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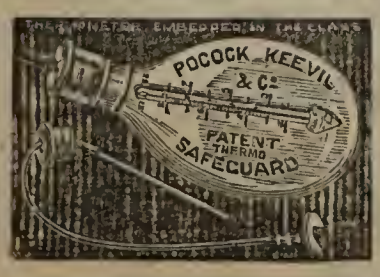

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Fig. 3.
Double, for the Chest and Back.

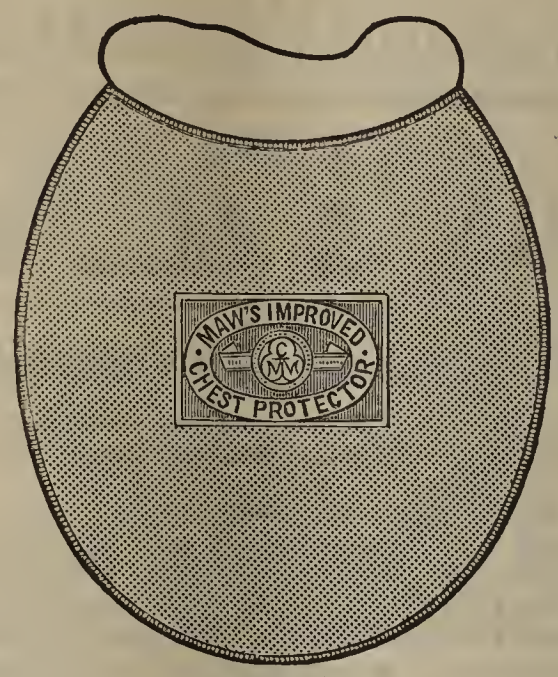

Fig. 4.
Single, Chest Protector.

Fig. 5.
Vest, a Shield for the Lungs.

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Fig. 3. Double	per doz.	20/	26/	32/	39/
Ditto, perforated	„	24/	32/	38/	46/
Fig. 4. Single	„	9/	11/6	13/6	16/
Ditto, perforated	„	11/	14/	16/	19/
Fig. 5. Vests „	„	27/	34/	42/	51/

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Fig. 3. Double, best, per doz.	17/	22/	27/	33/	44/
Ditto, second „	14/6	19/	23/	28/	37/
Fig. 4. Single, best „	7/6	9/6	11/	14/	20/
Ditto, second „	6/6	8/	9/6	12/	16/
Fig. 5. Vests, Scarlet „	17/	22/	27/	33/	40/

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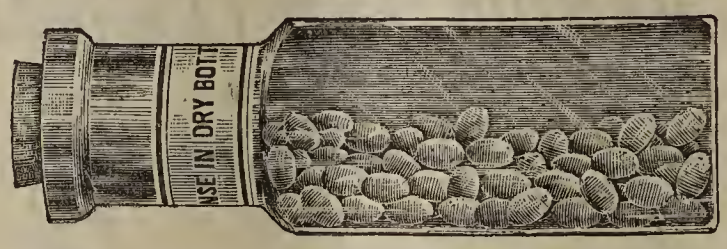
EXACT  SIZE.

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"Among the exponents of modern pharmacy no firm in this or any other country has acquired a more world-wide reputation than the one which, under the style of Burroughs, Wellcome & Co., has become familiar to every reader of these pages within the last ten years. We have a number of old-fashioned friends (who will, we hope, be ever with us) to whom the new-fangled notions of this corner of the nineteenth century are an abomination and a terror, and to whom these pharmaceutical strivings after novelty and perfection in the manipulation of the raw material of the medical armoury have an odour of anything but scientific sanctity. To them the introduction of a new medicine or a new form of an old medicine is a solemn event which should only be undertaken with due regard to all medical and pharmaceutical proprieties, as they understand them. Progress by means of research laboratories or properly-incorporated societies, and after methodical discussion by recognised authorities, is in their view the only genuine article, and the intervention of commercial enterprise, or of Frenchmen, Germans, or Americans, seems to them to be an uncalled for interference with the natural order of things.

"But these gentlemen speak too late. Enterprise in pharmacy is the order of the day. The new generation of medical practitioners are eager for all the aid that skilled pharmacy can give them, and London is the market in which the *best men win*, regardless of nationality. Messrs. Burroughs, Wellcome & Co., since their establishment here, have set themselves not only to meet, but rather to anticipate, the demands of the medical profession, and it is fair to say that in carrying out their plans they have acted with the utmost loyalty to their pharmaceutical colleagues. They have found it possible to create an entirely new class of business in what seemed to be a sufficiently crowded trade, and they have brought this about by methods and manners sufficiently novel to be worthy of record in these pages."—THE CHEMIST AND DRUGGIST, *January* 28, 1888.

To our unsuccessful imitators, chagrined and discomfited by their failure to find acceptance of their inferior products as substitutes for the original and true, we owe no thanks; however, we are not sad because we are so much pursued by these would-be imitators, for, by following in our wake like a pack of hungry wolves, ravenous for our substance, they only emphasize the importance of our products, and bring into vivid contrast their own failure with our success.

The paragraph from THE CHEMIST AND DRUGGIST headed "*Stealing the Handcuffs*," which we quote elsewhere, shows to what depths these parasites of the trade will descend.

Geo. R. Sims ("Dagonet") recently said :—

"The work of a man's brain is, or ought to be, as worthy of respect as his pocket-handkerchief. If a man takes my pocket-handkerchief and picks my name out of it, he is called something which is not nice. But if I called the man who takes my work and picks my name out of it the same something, I should be told I was unduly severe."

This applies with even greater force to those who, in pirating our products, become "the same something," for they not only take what is ours, but they also wrong the consumer by substituting inferior products, which fail to serve the purpose. Some of these imitators, while pretending to be anxious to raise the standard of pharmacy, are, in reality, far more concerned and distressed because certain manufacturing chemists have carried the standard beyond and above their ken, and are now reaping the well deserved fruits of legitimate enterprise—in spite of the covetous imitators' cowardly attacks and piracies.

Our own success through originality, and the failure of "our friends the enemy" through their cupidity, barrenness, and indolence, is satisfactory to us. We have every evidence that we lack not the support of the good and true of the profession and trade, for they appreciate and pay just tribute to those who think and act for themselves, originate and improve, and contribute to the progress of medicine and pharmacy, while they hold in distrust and contempt those who attempt to impose upon them by substituting counterfeits.

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Continued on p. xiii.

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Harker, Stagg & Moss.
Hatrick, W. R., & Co.
Hearon, Squire & Francis.
Herrings & Co.
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Hill, A. S., & Son.
Hodgkinson, Prestons & King.
Hodgkinsons, Stead & Treacher.
Horner & Sons.
Huskisson, H. O., & Co.
Johnson & Sons.
Lofthouse & Saltmer.
Mackay, John, & Co.
Oldfield, Pattinson & Co.
Reynolds & Bransom.
Southall Brothers & Barclay.
Sumner, R., & Co.
Taylor, James.
Warren, A. & J.
Woolley, James, Sons & Co.
Wright, Layman & Umney.
Wyleys & Brown.
Wyman & Westwood.

THOMAS HUBBUCK & SON, 24, Lime Street, LONDON.

PUMILINE

The only Pure Essence and Extract of Snow-grown Pumilio Pines.

FOR GOUT, RHEUMATISM, BRONCHITIS, SORE THROATS, AND CHEST AFFECTIONS.

THE SNOW-GROWN PINUS PUMILIO.

Sir MORELL MACKENZIE wrote, December 9, 1887.

"I have much pleasure in stating that I have made use of Oleum Pumilionis during the last twenty-five years, and that I consider it a most valuable preparation. It acts as an admirable tonic to the mucous membrane of the air passages in cases of chronic bronchitis and laryngeal catarrh. I am glad, therefore, to hear that the remedy is about to be used on a large scale, and I have no doubt the results will be highly satisfactory." (Signed) MORELL MACKENZIE, M.D.

Pumiline ALONE, with the single exception of Pinol, possesses the physical and chemical properties which give it the faculty of being administered with SAFETY. It is therefore essential for Chemists to use Pumiline, as it is the only preparation obtained from snow-grown Pumilio Pines.

For Trade Price Lists, Pamphlets, Analytical Reports, &c.,

G. & G. STERN, 11, BILLITER SQUARE, LONDON, E.C.

TRADE MARK

REGISTERED.

DR. JOHN FRANCIS CHURCHILL'S INHALANT

"SPIRONE" TRADE MARK

FOR THE TREATMENT AND CURE OF ALL

Diseases of the Lungs, Windpipe, Nose, and Throat,

Claims to be a Specific for all Congestive and Inflammatory conditions of the Respiratory Apparatus, and will be found efficacious in

COUGHS & COLDS, ASTHMA, BRONCHITIS,

Inflammation and Congestion of the Lungs, Pneumonia, Pleurisy, Whooping Cough, Croup, Diphtheria, Pharyngitis, Laryngitis, Catarrh, Sore Throat, Quinsy, Enlarged Tonsils, Hoarseness, Loss of Voice, Colds in the Head, Ozœna, Hay Fever, and all other Complaints of the Respiratory Organs.

Prepared only by the Inventor: None Genuine except such as bears the Trade Mark and his Signature upon the Bottle, on the Label over the Cork, and on the Wrapper,

JOHN FRANCIS CHURCHILL, M.D. (PARIS),

The Discoverer of the Specific Cure for Consumption, and of the Medicinal Properties of the Hypophosphites.

Price 4s. 6d. and 11s. per Bottle. Set of Apparatus for Administration, 15s. Pamphlets and Show Cards free on application.

THE SPIRONE COMPANY, LIMITED.

DEPOT—17A, DUKE STREET, MANCHESTER SQUARE, LONDON, W.

Successful Pharmacy.

(Continued.)

their doctor by secretly destroying or throwing away medicines that offend the taste or are repulsive in appearance, and this even in cases where the successful action or the failure of the remedy is perhaps a matter of life or death ; as a natural result, if the patient dies or derives no benefit, the doctor or the drug, or both, bear the blame.

Snow Hill Buildings.

BURROUGHS, WELLCOME & CO.'s Offices and Warehouses, occupying Seven Floors in all.

The following notes include several of the more important discoveries and improvements of the year :—

Sulphonal, the new hypnotic, produces sweet sleep and no harmful effects.

Salol, the new anti-rheumatic.

Antipyrin, the new anti-pyretic, which has already gained an established place in therapeutics.

Our improved Lanoline products.

Vaporoles, for inhalation and fumigation.

Tabloids of triturated drugs, embracing tinctures, alkaloids, &c.

The tabloids of compressed drugs, in accurately divided doses, greatly lessen the risk of error by nurses and patients, and afford an unchangeable and acceptable form for administration ; and at the same time these medicines are so compact and portable that patients travelling or attending to business, professional, or official duties, can easily carry the remedies prescribed in the waistcoat pocket.

The Valoids of assayed drugs represent one grain of the standard drug in each minim. This is the most concentrated liquid form in which *simple entire drugs of definite strength* can be prescribed. Physicians and chemists regard the Valoids as a convenient and reliable means of preparing officinal and unofficinal tinctures, syrups, infusions, lotions, &c., at a moment's notice by proper dilution. Thus the use of Valoids obviates the necessity of carrying bulky stocks of tinctures, &c., and insures uniformity of strength.

Elixoids of various nauseous drugs, such as Iodide of Potassium, Valerianate of Ammonia, &c., are so palatable that patients regard the remedy prescribed in this form more as a nectar than as a medicine.

Having made important improvements in our machinery and apparatus, and having greatly increased our manufacturing facilities, we are now enabled to offer very great reductions in the prices of several of our articles, including our Tabloids and Tablets of Compressed Drugs. The advantages of these compressed goods—ease of administration, accuracy of dose, as well as the absolute purity of the drugs—are well known.

Particular attention is invited to our new style vinaigrette oval bottles of Tabloids and Tablets in tasteful glass-fronted cartoons—making a beautiful display for the chemist's showcase and window.

The prices of *Tabloids of Soluble Quinine* are now so slightly in advance of the cost of the crude drug as to render this form profitable for dispensing in place of ordinary pills or powders, and these tabloids dissolve much more quickly.

The reduced prices now place perfected goods within the reach of even the poorest classes, so that there will no longer be any excuse for substituting impure and otherwise imperfect preparations for our *original and genuine* products. Every chemist who cares for his own good name will prefer to dispense *the best.*

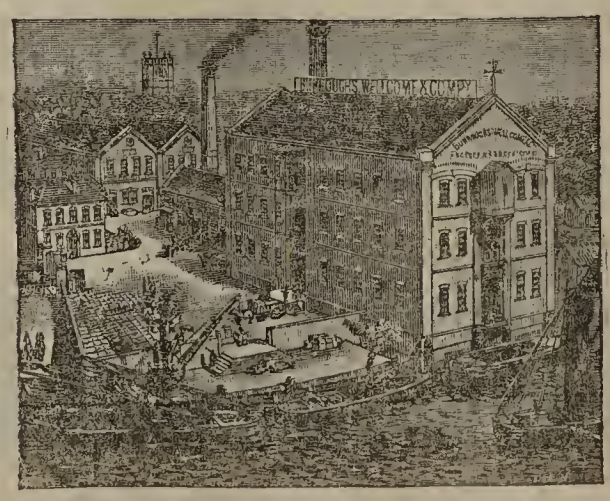
We shall continue in our endeavours to excel in all our products, and as nearly as possible to attain perfection in their manufacture. We shall not be content simply to keep pace with other manufacturers in this era of progress, but shall, as in the past, strive with all zeal to keep the lead in perfecting improvements in pharmacy.

Our claim for favour and preference is based solely on the sterling merits and absolute superiority of our products.

We hold ourselves ready in the future, as in the past, to receive back any articles manufactured by us, if in unbroken packages, if they are found slow of sale, and give choice of any of our other goods in exchange in London.

Although this privilege of exchange has been freely offered by us from the commencement of our business, very few of our goods have been returned, proving that the articles we have introduced meet with a ready sale.

Our prices afford a very good profit to the trade. We shall at all times endeavour to protect chemists in their legitimate profits, and trust to their spirit of fair play to protect us by discouraging the sale of the various cheap imitations of our articles.



BURROUGHS, WELLCOME & CO.'S Factory and Laboratories, occupying Six Buildings and River Wharf.

We offer our best thanks to the trade for their ready appreciation of our various chemical and pharmaceutical improvements, and shall be glad to co-operate with them at all times for the purpose of increasing their sales upon our goods. Printed matter, show-cards, &c., supplied on request.

The wholesale trade generally supply our goods on most favourable terms.

With greetings,

We remain, very respectfully,

BURROUGHS, WELLCOME & CO.

DRUGS, CHEMICALS, & PHARMACEUTICAL PREPARATIONS

BARRON, SQUIRE & Co.

(LATE DREW, BARRON & CO.)

WHOLESALE & EXPORT DRUGGISTS,

BUSH LANE, LONDON, E.C.

Telegraphic Address: "NORRAB, LONDON."

Manufacturers of all descriptions of Pharmaceutical Preparations,

Beg to inform Merchants, Shippers, &c., that all Indents entrusted to them will receive careful attention and prompt execution.

Messrs. B., S. & Co. request the attention of their friends and the Trade, at home and abroad, to their having PURCHASED THE BUSINESS of Messrs. JAMES BASS & SONS, Hatton Garden, and with it the various formulæ from which their Special Preparations have been made, and pledge themselves to supply them in all their integrity.

Specimens of these Preparations have remained in the Museum of Kew Gardens during 23 years without deterioration.

GOLD MEDALS EDINBURGH AND LIVERPOOL EXHIBITIONS.

FRY'S

Pure Concentrated

COCOA

TRADE MARK.

Prepared by a new and special scientific process, securing extreme solubility, and developing the finest flavour of the Cocoa.

PURE — EASILY DIGESTED — ECONOMICAL.

From SIR CHARLES A. CAMERON, M.D., *President of the Royal College of Surgeons, Ireland, &c.*

"I have formed A HIGH OPINION OF ITS DIETETIC VALUE. I have never tasted Cocoa that I like so well. It forms a beverage pleasant both in flavour and odour. IT IS ESPECIALLY ADAPTED TO THOSE WHOSE DIGESTIVE ORGANS ARE WEAK."

36 Prize Medals Awarded to the Firm.

J. S. FRY & SONS, BRISTOL, LONDON, and SYDNEY.

VAN HOUTEN'S COCOA.

EASILY DIGESTED — PURE — SOLUBLE — MADE INSTANTLY.

Incomparably **THE BEST AND MOST ECONOMICAL.**

Being very strong & nutritious THIS Cocoa is cheaper & more satisfying than tea.

"Admirable," "flavour perfect," "and **so pure.**" } BRITISH MEDICAL JOURNAL. } "Delicate aroma," "**pure** & unmixed," "goes a long way." } THE LANCET.

"Once used, always used."—HEALTH.

SAMPLE TINS GRATIS { through your grocer or chemist.

"Stealing the Handcuffs."

"With this appropriate remark a correspondent [not B. W. & Co.] sends us a reprint from THE CHEMIST AND DRUGGIST of a clever advertisement entitled 'Pirates,' inserted some time since by Messrs. Burroughs, Wellcome & Co. The advertisement commenced—'They [the pirates] are getting rather numerous of late. They make bungling work of it. They copy what they think will do them most good, and not one of them has had the manliness to as much as say "by your leave, sir." They copy our advertisements, and in divers ways seek to deceive the public and steal our thunder.' At the foot of the circular on which this is reprinted is found the name '* * *, manufacturing and export Chemist, * * *.'"—*Chemist and Druggist*, August 25, 1888.

A GENTLE HINT.

Pirates.

They are getting rather numerous of late. They make bungling work of it. They copy what they think will do them most good, and not one of them has had the manliness to as much as say—"By your leave, sir." They copy our advertisements to make people believe that theirs are ours till they get into them; they have used our trade names which we have made popular and valuable by expenditure and work; they denounce the improvements we introduce, until, in spite of their underhanded manœuvres, we secure the just appreciation of the profession, and then they make imitations in appearance, but not in quality; they pirate our trade names, and in divers ways seek to deceive the profession and steal our thunder.

To us it appears truly humorous that firms whose antiquity is their prime boast, and whose traditions harp upon the integrity of ancestral founders, should play such catchpenny antics. Having won by genuine merit and originality the confidence of the profession and trade, we can, so far as we ourselves are concerned, regard these puny pirates very much like the story of the bad marksman shooting at the frogs—it was sport to the one and didn't hurt the others. Still they give us a theme to descant upon. It is our duty to protect our friends.

When the lame man made a bargain with the blind man for the latter to carry him, they were neither of them in business worth mentioning, and the bargain was mutually advantageous; but for one who might both walk and see to saddle himself on to another is not delicate, to say the least. We feel that we can see and walk, and when those who might do the same try to ride on our industry it seems our bounden duty to point out to them how unbecoming their conduct really is.

We have become more or less used to imitators, and when the thing is done right handsomely it almost seems like a compliment: but to be a compliment it should certainly be free from the semblance of fraud. "Me too" has ever been the motto of trade pirates, and of those who have lost their grip and of those who never deserved.

For the edification and comfort of our imitating neighbours we offer an allegory—it is a very ripe chestnut, but a sound one; and here it is. Once upon a time, not so very long ago,—as the story goes, a company of soldiers were garrisoned in mountain wilds where there were Indians on the warpath. One day a tribe of Red Men were spied in a valley, and the soldiers were forthwith ordered out in great haste. They strapped a cannon on the back of a mule, and hastened away to give battle. When they reached the crest of a cliff they saw the war-dancers in the valley below.

They had no time to dismount the cannon, so turned the mule about as a gun-carriage and fired. The howitzer "kicked" so tremendously that it knocked the animal off his legs, and cannon and mule rolled precipitately down the hill into the midst of the Indians, scaring them nearly out of their wits, and frightening them into hasty retreat—all but one, who was so paralysed with fear that he allowed himself to be captured and taken to the camp. When interrogated as to why he allowed himself to be taken, he exclaimed—"Me no 'fraid soldier man, me no 'fraid of cavalry man, but when live jackasses fired me, me think the devil must be near."

Though we do not confess that we are timid, or much unnerved, the Indian's case is in some respects like our own. Legitimate business warfare may be engaged in with satisfaction, and we heartily applaud all new improvements and legitimate enterprise from whatever source they come; but who like trade "jackasses" precipitated upon them as competitors?

Now, Imitators, we enjoin upon you to discard your schoolboy mimicries. We don't expect much of you.

"* * * No earth-born will
Could ever trace a faultless line;
Our truest steps are human still,
To walk unswerving were divine."

Still "Be not too bold!" "Assume a virtue if you have it not." When you want a new name for one of your products (or imitations) give it a name that does not deceive. Give it a name that has not been made valuable by others' expenditure and industry. Give it a name that, when you make your sales, you can say to yourselves—"These do not rightfully belong to another." What is it to appropriate a trade name but to take what another has laboured for and that may become in all equity his means of subsistence? Sales thus made are dearly bought. A word more: we would suggest that those whose enfeebled intellects prevent them from creating anything original, and who find it necessary to copy our advertisements, might do so in such a manner that readers will not be led into mistaking and reading their pages for ours.

Those who have, through inadvertence, trespassed upon our rights, and who have made the *amende honorable* when we have called their attention to the trespass, we acquit of all wrong intent, and can but respect their frankness and honesty of purpose. Everyone is liable to tread unwittingly upon the rights of his fellow-men, but an honest man is ready to admit his fault and relieve his conscience. Wilful trespassers who persist in wronging us, and thereby render themselves liable under the law, we have punished, and shall punish, with the utmost severity. Those who wilfully trespass upon our rights, but cunningly evade the liabilities of the law, we shall expose to the ignominy they so justly deserve.

BURROUGHS, WELLCOME & Co., Snow Hill Buildings, LONDON, E.C.

NOTE.—This is a facsimile of the page advertisement referred to by the CHEMIST AND DRUGGIST. The party who appropriated it copied it word for word, except in substituting his name for ours.—B. W. & CO.

1888. TWENTY-SECOND SEASON.

REGISTERED LUNG PROTECTOR TRADE MARK

THE

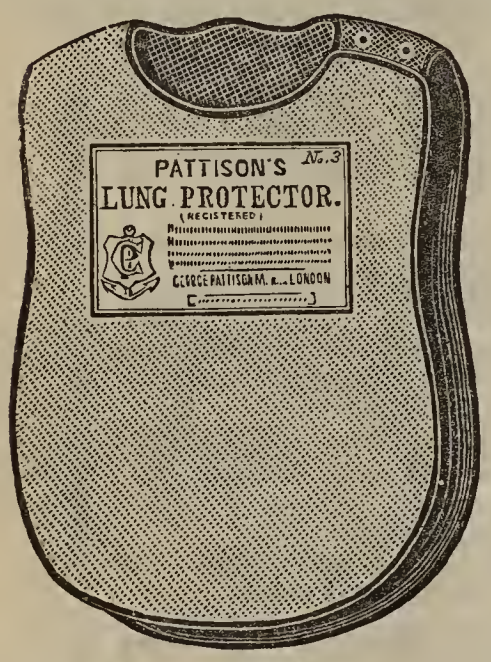
LUNG PROTECTOR

(REGISTERED).

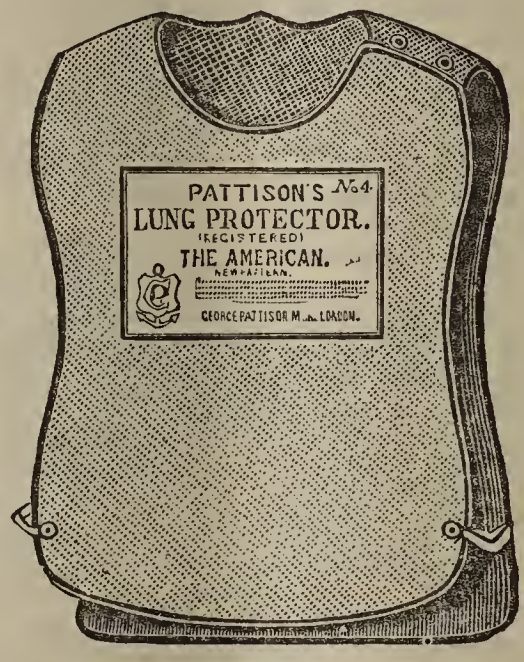
"AN ARTICLE OF ACKNOWLEDGED EXCELLENCE."

The "LUNG PROTECTOR" continues to be made only from the same Fine Soft Wool which has always been used since its introduction, 22 years ago.

Chemists are respectfully cautioned against imitations made from lower quality Wool, although sold as "Best Felt."



The Lung Protector.
ORIGINAL PATTERN



Lung Protector.
THE AMERICAN

Lung Protector.
THE CANADIAN.

PRICES:

	No. 0.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	
ORIGINAL PATTERN, Eight sizes ...	14/-	18/-	26/-	34/-	42/-	52/-	60/-	70/-	per doz.
THE AMERICAN, Seven sizes		20/-	28/-	36/-	44/-	54/-	62/-	72/-	„
THE CANADIAN, Seven sizes		22/-	30/-	40/-	50/-	60/-	70/-	80/-	„

FELT CHEST PROTECTORS.

	No. 00.	No. 0.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	
Nine sizes	4/-	6/-	8/-	10/-	12/-	16/-	20/-	24/-	28/-	per doz

All in Scarlet and White, and made in same Wool as the "Lung Protector."

FELT CHEST PROTECTORS, C. QUALITY. { Single .. No. 1, 7/-; 2, 9/-; 3, 11/-; 4, 14/-; 5, 18/- per dozen
Double .. No. 1, 16/-; 2, 22/-; 3, 28/-; 4, 34/-; 5, 44/- „

These are warranted equal to BEST of other makers, but are NOT recommended.

Terms: All Wholesale Houses either allow a large Discount for Cash, or quote the goods at Reduced Net Cash prices.

GEORGE PATTISON,

Inventor and Manufacturer,

139, ST. JOHN STREET ROAD, LONDON, E.C.

"THE MONTH."

Aselline and Morrhuine.

Notwithstanding that cod liver oil has attained so important a position in the materia medica it is still numbered among the remedies imperfectly understood as to the principles upon which their therapeutic action depends. A short time since (*Pharm. Journ.*, July 28, p. 62) Messrs. Gautier and Mourgues reported upon several bases of the nature of leucomaines that they had discovered in the light brown variety. Four of these were volatile and were identified and described as butylamine, amylamine, hexylamine and hydrodimethylpyridine. Two fixed bases, which were then briefly referred to under the names aselline and morrhuine, are now described more fully, the latter apparently being of some physiological importance (*Compt. Rend.*, cvii., 626). They were obtained by extracting with ether the basic paste left after distilling off the volatile bases, evaporating the ethereal solution, dissolving the residue in dilute hydrochloric acid and treating the solution with perchloride of platinum, when two platinochlorides were formed, one insoluble, the other soluble in the cold. The base separated from the insoluble compound is named "aselline" and represented by the formula $C_{25}H_{32}N_4$. It is described as forming crystalline salts, being a nearly colourless amorphous mass which is coloured green if not preserved from the action of light, sp. gr. about 1·05, and melting to form a yellowish viscous liquid that has an aromatic odour recalling that of the ptomaines. It is nearly insoluble in water, to which, however, it communicates a slight bitterness and faint alkalinity; but it is soluble in ether and more freely in alcohol. This base was found to be relatively feeble in its physiological action; nevertheless it produced symptoms of fatigue, shortness of breath and stupor, and a greenfinch was killed by three milligrams of it in fourteen minutes. Morrhuine ($C_{19}H_{27}N_3$) was obtained as a crystalline platinum compound on concentration of the mother-liquor after removal of aselline. The free base formed a very thick oily amber-yellow liquid, lighter than water and only slightly soluble in it, very alkaline and caustic to the tongue. It constituted two-thirds of the total bases found in cod liver oil, each tablespoonful of the oil containing about 2 milligrams. It manifested the power of exciting the appetite as well as most remarkable diaphoretic and especially diuretic properties. A guinea-pig, weighing 240 grams, into which 0·029 gram of morrhuine had been injected in the state of hydrochlorate, lost in two and a half hours by transpiration and especially by urination 13·5 grams. The diuretic and diaphoretic properties of cod liver oil have been long known, as well as its power to excite the appetite, and it appears probable that these may be associated with the occurrence of morrhuine.

Eseridine.

"Eseridine" is the name that has been given by Herr Eber to an alkaloidal substance said to occur already formed in the Calabar bean, and also to be producible from physostigmine. According to a recent paper (*Pharm. Zeit.*, Oct. 13, p. 611), when physostigmine is treated with sulphurous acid or grape-sugar alkali, two compounds are formed, one giving a violet colour with hydriodic acid, apparently the compound named "inactive physostigmine" in a previous paper (*Pharm. Journ.*, Sept. 1, p. 161), and the other the "eseridine" in question, which liberates iodine energetically. The relative yield appears to depend upon the intensity of the chemical action, the proportion of the iodine-liberating compound being preponderant when sulphurous acid is used and that of the other compound when grape-sugar alkali is used. Eseridine is only sparingly soluble in water and soluble salts have not yet been prepared; in some subcutaneous experiments made to test its physiological action it was therefore brought into solution by the addition of dilute sulphuric acid. From the results on animals it was inferred that eseridine resembles physostigmine in its laxative action, though without disturbance of the cerebral nervous system, and that it is an irritant of the spinal cord, but not cumulative in its action like strychnine. The dose required to produce toxic results was six times greater than that of physostigmine. Herr Eber appears to claim certain advantages for eseridine over physostigmine on the ground that it is permanent in solution, six times less poisonous, and that it acts upon the bowels with a minimum of disturbance of the nervous system. Whether these claims are well-founded must be proved by experience, as also, probably, its right to be deemed a new discovery. The alkaloid is prepared in a crystalline form by Messrs. Boehringer, of Manheim, who have published some further information concerning it, according to which its composition is represented by the formula $C_{15}H_{23}N_3O_3$, or as containing a molecule of water more than the physostigmine from which it is derived and into which it can be reconverted by suitable treatment with an acid. It also differs in being sparingly soluble in ether, in which physostigmine is very soluble.

Digitalis ambigua.

In an interesting pharmacological paper, published in the current volume of the *Medizinisches Jahrbuch*, Dr. Paschkis reports upon an investigation undertaken to ascertain whether the leaves of any species of *Digitalis* indigenous in Austria could be substituted for those of *Digitalis purpurea*, which are official in the Austrian Pharmacopœia, though the plant is not found wild in the country. The species selected was *Digitalis ambigua*, Murr. (*D. ochroleuca*, Jacq.), the flowers of which are pale yellow, marked inside with light brown reticulations and spots. The leaves differ from the official ones in the absence of the remarkable venation, as well as of the peculiar soft down and the grey colour. By suitable manipulation Dr. Paschkis separated from them, besides chrysophanic acid, bodies that he believes to be identical with Schmiedeberg's digitalin, digitalein, digitoxin and digitonin, the last mentioned yielding decomposition products corresponding in chemical behaviour to digitonein and digitogenin. In respect to physiological action the leaves of *D. ambigua* gave results corresponding qualitatively with those produced by the leaves of *D. purpurea*, and probably not differing much quantitatively. The same remark applies practically to the substances isolated from the leaves.

Adonis vernalis.

The active principle of *Adonis vernalis* prepared by different makers appears to have given rise to different therapeutic results in the hands of experimentalists, some finding its action uncertain and inconstant, and others meeting with better success.

It is now stated by Professor Podwissotzky (*Nat. Drugg.*, Sept. 1) that all samples of commercial adonidin examined by him proved to be merely mixtures containing more or less of the active principle together with other constituents of the plant. Of these he describes "adonidoquercitrin," a substance of an orange colour, "adonidodulcite," a saccharine body, crystallizing in beautiful prisms, an inactive amorphous brown glucoside, and adonidic acid. The chemically pure active principle, which he has named "picroadonidin," is an amorphous glucoside of an excessively bitter taste, easily soluble in water and alcohol and entirely so in ether. It possesses the properties of a cardiac poison in the highest degree.

Hedwigia balsamifera.

The physiological action of *Hedwigia balsamifera*, a native of the Antilles, and known there as "bois cochon" or "sucrier de montagne," has been investigated by Messrs. Gaucher, Combemales and Marestang (*Compt. Rend.*, cvii., 544). The results obtained by experiments on guinea-pigs and rabbits show that the root and stem possess poisonous properties, due to an alkaloid and a resin, the former appearing to be less active than the latter. The resin has a paralysing effect, commencing with the hind quarters and proceeding up the spine, the temperature of the body being considerably lowered at the same time, and the viscera, particularly the lungs, much congested. The paralysing and antithermic action of the alkaloid are less marked, but it has a distinctly convulsive action.

Euphorbia geniculata.

Professor Sieckenberger, of Cairo, reports that within the last few years, a South American species of *Euphorbia, E. geniculata*, Ort., has been introduced into Egypt, apparently accidentally, and has spread as a weed over the entire country. Already the plant is known to have given rise in different districts to losses of sheep, horses and cattle that were poisoned through eating it. The natives have commenced to use it as a medicine, either eating the young plants or drinking an infusion prepared from them, the consequences being sometimes rather serious. In a preliminary investigation of the plant, Professor Sieckenberger has obtained evidence of the presence in the juice of the acid resin characteristic of the euphorbiaceæ, as well as euphorbon and caoutchouc.

Cocoa-nut as a Vermifuge.

Referring to the recent statement of Professor Pariso as to the vermifuge properties of the cocoa-nut (*Pharm. Journ.*, Sept. 1, p. 162), a correspondent of the *Times of India* writes that the cocoa-nut has been used as a vermifuge in India for probably forty generations by the beefeaters of the country, and is so well known there as a means of expelling the flat worm that he cannot conceive how information of this fact has not reached England before. When properly prepared and intelligently administered, so says this writer, the cocoa-nut is equally efficacious with male fern oil, kousso, pomegranate root or turpentine, whilst it is as pleasant to the palate as they are offensive. He is of opinion that this is only one of many valuable Indian remedies that would become better known to the European practitioner if an edition of the Pharmacopœia of India were published, properly brought up to date.

Podophyllum peltatum in Japan.

In a communication upon a new Japanese genus of Berberidaceæ (*Journ. Bot.*, Oct., p. 303) Mr. T. Ito takes the opportunity to state that the occurrence of *Podophyllum peltatum* in Japan is beyond doubt, it being found on Mount Togakushi, in the province of Shinano, thus constituting another habitat for this plant besides those on the American continent.

Bacteria of Putrescence.

In the multiplicity of evils that are attributed now to the operations of bacteria, there is a danger that beneficial services possibly rendered by some kinds may be overlooked. In a recent communication upon the subject (*Pharm. Centralh.*, Oct. 25, p. 529), Dr. Weibel speaks of a class of "putrescence vibrios" which develope in substances that have already passed into a state of offensive putrescence under the influence of other microbes, the putrid products of the latter, in fact, affording nutriment to the former. Such putrescent products, he points out, are for the most part directly poisonous to the human organism, and it is of great hygienic interest that their breaking up should be the work of another set of microbes; that in fact there is a class of vibrios whose *rôle* it is not to give rise to putrid products, but to do away with them. Dr. Weibel also found that these vibrios have the power of developing in very dilute nutritive solutions, where they hold their own with other bacteria, and he thinks that the self-purification of streams may be a result of their activity.

Salicylic Acid in Dermatology.

In a paper read before the American Dermatological Association, Dr. Heitzmann, of New York, reports the results obtained by himself during the last three years in the treatment of various disorders of the skin with salicylic acid (*Bost. Med. and Surg. Journ.*, Oct. 4, p. 336). Its action upon horny epidermis and its value in the treatment of sweating feet are already known. In seborrhœa, especially when combined with acne, it had given good results, a dressing containing one per cent. of salicylic acid and eight per cent. of sulphur proving an excellent application for dandruff. In urticaria it allayed the itching, and an ointment containing six to ten per cent of the acid had been found to check outbreaks of furunculosis. Ninety-six cases of eczema had been satisfactorily treated, "using generally one per cent. of the acid, with equal parts of zinc powder and starch in two parts of ointment." A three per cent. solution had proved useful in removing pigment patches in acne, in the treatment of comedones and in rendering the skin soft. For impetigo contagiosa it was found to be "*the* remedy," curing the disease in ten or twelve days, and a solution with gutta percha was found useful in tinea. Dr. Heitzmann gave other instances of the usefulness of this remedy, and his experience was confirmed to some extent in the discussion that followed the reading of the paper.

Anthrarobin.

At the same meeting, Dr. Bronson gave the result of his experience with anthrarobin, the compound discovered by Professor Liebermann a short time since and recommended as a substitute for chrysarobin. He stated that he had treated cases of psoriasis in the Charity Hospital, applying a ten per cent. mixture of anthrarobin with vaselin on the right side of the body and a similar ointment of chrysarobin on the left side. In five out of eight cases, where an

alkaline bath was given each day before the application, improvement began sooner and went on more rapidly on the right than on the left side, but upon discontinuing the application the recurrences were most frequent on the right side. In the other three cases the alkaline bath was at first omitted, and the improvement was then more marked on the left side; but as soon as baths were commenced the right side began to improve more rapidly. The stain caused by the application of anthrarobin is described as having been dark brown and deeper than that caused by chrysarobin, but limited to the area of the application. Anthrarobin was not found to have any antipruritic effect; on the other hand, it caused irritation in only one case, in which a twenty per cent. preparation was used.

Mercuric Succinimide.

Among the numerous mercurial preparations that have recently been the subject of eulogy as antisyphilitics, mercury succinimide has been specially recommended by Herr Vollert for subcutaneous injection, as it does not precipitate albumen or pleuritic or hydrocelic liquids (*Pharm. Centralh.*, Oct. 4, p. 489). This compound was described as far back as 1852 by M. Dessaignes (*Ann. Chim. Phys.*, xxxiv., 146) as being formed when mercuric oxide is dissolved in succinimide, the solution slightly concentrated, filtered hot and allowed to cool, when mercuric succinimide crystallizes out. The compound, two parts of which represent one part of mercury, is said to occur in commerce as a white silky powder, readily soluble in water, the aqueous solution remaining clear and not becoming turbid after standing a considerable time. The strength of the solution recommended by Herr Vollert as most suitable for subcutaneous injection contains 1·3 grams of the succinimide in 1000 grams of water. The addition of cocaine for the purpose of diminishing the smart is not permissible to an extent beyond 0·01 gram to the syringeful; a larger quantity causes precipitation.

Cobalto-Nitrite of Potassium.

Attention has lately been directed by Dr. J. W. Roosevelt to cobaltonitrite of potassium, as worthy of trial in cases where nitrites are now used (*Therap. Gaz.*, Oct., p. 685). He believes that it does not produce so much discomfort as other nitrites, while it seems to relieve arterial tension, and also lessen the dyspnœa of uræmia and asthma. The salt is prepared by adding a solution of potassic nitrite to a solution of a salt of cobalt previously acidulated with acetic acid, when a crystalline precipitate is formed of a yellow or olive colour. It has been given to human beings in half grain doses every two or three hours. To dogs as much as 5 grains have been given without any dangerous effect.

Uranium Salts.

At a recent meeting of the American Physiological Society Dr. R. H. Chittenden read a paper on the physiological action of uranium salts, in which he stated as the result of his experiments that uranium is an irritant poison producing gastro-intestinal irritation of greater or less intensity, resulting in most cases in simple enteritis, but often becoming an acute catarrhal inflammation (*Therap. Gaz.*, Oct., p. 698). Its effect on nutrition is shown by rapid emaciation. It produces also acute parenchymatous nephritis, toxic doses causing complete suppression of urine, although small doses cause at first an increased secretion. Glycosurin and the presence of a large amount of calcium oxalate in the urine are characteristic features in uranium poisoning.

Cæsium and Rubidium.

The physiological action of the salts of cæsium and rubidium have also been the subject of a fresh investigation by Dr. Botkin (*Lancet*, Oct. 13, p. 734), the results of which are very similar to those already reported by Dr. Ringer. The chlorides of both these metals, when introduced into the blood, raise the arterial pressure and slow the beats of the heart, this being dependent chiefly on stimulation of the pneumogastric centre; at the same time the peripheral inhibitory apparatus of the heart is affected, especially by the cæsium salt. The difference between the action of the salts of cæsium and rubidium and those of potassium is mainly of a quantitative character, the potassium salts being the most active and the cæsium salts the least so. In some cases of compensatory trouble of the heart rubidium chloride was used with salutary, though slight effect, a drachm being made into a six-ounce mixture with water and a tablespoonful given five times daily.

Salol and Betol.

Some recently introduced improvements in the manufacture of salol may open the way for the preparation of a large number of similarly constituted organic compounds. It has been found that in the preparation of salol from salicylic acid and phenol or from sodium salicylate and phenol-sodium, instead of subjecting them to the action of phosphorus oxychloride or pentachloride the acid sulphates of alkalies may be used (*Pharm. Centralh.*, Oct. 25, p. 530). These exercise a strong dehydrating action, salol being formed according to the equation:—

$$\underset{\text{Salicylic Acid.}}{C_6H_4\begin{cases}OH\\COOH\end{cases}} + \underset{\text{Phenol.}}{C_6H_5OH} = \underset{\text{Salol.}}{C_6H_4\begin{cases}OH\\COOC_6H_5\end{cases}} + H_2O$$

As solvents and diluents benzol and toluol are used, being recovered by distillation. The reaction follows a similar course when α-oxynaphthoic acid, o- or p-nitrosalicylic acid or resorcincarbonic acid is substituted for salicylic acid, or when resorcin, pyrogallol, thymol, nitrophenol, α- or β-naphthol, dioxynaphthalin or gaultheria oil takes the place of phenol.

Iodate in Iodide of Potassium.

A method of removing iodate from iodide of potassium is described by Messrs. Morse and Burton (*Analyst*, Oct., p. 190). It consists in boiling a solution of the contaminated iodide with zinc amalgam, by which means the iodate is completely reduced, with formation of zinc oxide, whilst the solution after filtration is found free from both mercury and zinc. The amalgam used should be rich in zinc, and the paper filter should be saturated with boiling water before pouring the hot liquor upon it. The efficacy of the method was tested upon pure iodate of potassium, a gram of which, dissolved in 50 c.c. of water, was completely reduced in forty-five minutes. The bromate and chlorate of potassium also are both reduced by zinc amalgam, but more slowly.

Test between Hippuric and Benzoic Acids.

According to M. Denigès (*Compt. Rend.*, cvii., 662), if a small quantity of hippuric acid or of a hippurate be boiled for a few moments in a little alkaline solution of sodium hypobromite, such as is used in urine testing, some bubbles of gas are given off and a reddish yellow turbidity makes its appearance and goes on augmenting up to a certain point. Upon cooling, a precipitate of a

bromine derivative is deposited, having the appearance of a kermes red powder. More or less similar precipitates are described as being formed with other aromatic compounds and nitrogen derivatives, but with benzoic acid under the same conditions M. Denigès says that no reaction takes place.

Safranin as a Test for Grape Sugar.

According to M. Crismer, the organic colouring compound that passes under the name "safranin" is a convenient reagent for recognizing the presence of grape sugar (*Pharm. Zeit.*, Oct. 31, p. 65), the reaction being dependent upon its ready solubility in water and its easy conversion by the action of a reducing agent into a colourless leuco-compound. Upon heating two or three cubic centimetres of a 1 in 1000 solution of ordinary safranin in a test-tube with a few drops of a solution of grape sugar and two or three cubic centimetres of a ten per cent. soda solution, the liquid loses its colour when the temperature rises to about 60° to 65° C. The colourless compound formed by the reduction of the safranin being insoluble, the liquid as it cools shows a milky turbidity; but after standing a time red streaks appear on the surface due to the re-formation of safranin from the colourless compound by the oxidizing action of the air in the tube. Uric acid, creatine, chloral, chloroform, hydrogen peroxide and hydroxylamine salts all reduce Fehling's solution and may be confounded with grape sugar, but they do not decolorize safranin. Chloral and chloroform gradually cause the red colour to become fainter, with development of isonitril, but they do not effect a complete decoloration and there is no separation of the insoluble leucobase. Albumen on the other hand decolorizes the solution slowly, but perfectly. Normal physiological urine also has a faint reducing action upon safranin, and if, as M. Crismer believes, the reducing agent in it be grape sugar, the amount of sugar in normal urine would amount to several hundredths per cent. The method recommended by M. Crismer to be followed in urine examination is to boil together 1 c.c. of the urine with 5 c.c. of safranin solution (1 in 1000) and 2 c.c. of soda solution. If decoloration takes place, the urine may be looked upon as diabetic, since the quantity of sugar present in normal urine is not sufficient to reduce the 5 c.c. of safranin solution completely.

Tests for Essential Oils.

The testing of essential oils formed the subject of an interesting communication read before the Pharmacy Section of the 'Naturforscher' Society at Cologne by Herr Kremel, in which it was proposed to utilize the differences in the behaviour of essential oils towards alcoholic potash solution as a means of determining their identity and purity (*Pharm. Centralh.*, Oct. 4, p. 482). The author stated that he had applied this test to a large number of essential oils, with the following general results. Genuine rose oil contains scarcely any saponifiable constituent, but eight or ten samples of geranium oil, from different countries, each gave tolerably high saponification numbers. Lavender oil gave very high saponification numbers; lemon oil, on the contrary, did not. Artificial bitter almond oil gave higher saponification numbers than the natural oil, and upon decomposing the saponified mass from the latter with acids a crystalline precipitate was formed amounting to 40 or 50 per cent. of the oil used. A similar precipitate was formed, but in smaller quantity, upon decomposing the soap from peach-kernel and other similar oils, but not from the soap of artificial bitter almond oil. It was thought that probably this reaction might also furnish a basis for a test for aqua amygdalarum and aqua laurocerasi.

Cocoa-nut Oil in Lard.

Mr. A. H. Allen reports (*Analyst*, Oct., p. 189) that recently he has had submitted to him a sample of lard that gave a negative response to the nitrate of silver test, but presented other characters that made him suspect adulteration with cocoa-nut oil, a suspicion that was confirmed upon further examination. Mr. Allen points out that the very characters which render it difficult to detect and determine cocoa-nut oil in butter suffice to make its detection and determination in lard, even in presence of cotton-seed oil and tallow, a certain and fairly simple operation. Cocoa-nut oil differs from lard in its low iodine absorption number (9), its lower saponification equivalent (209 to 228), and the much larger proportion of volatile acids; but Mr. Allen thinks the most accurate determination of the cocoa-nut oil is obtainable from the saponification equivalent, since its estimation is practically unaffected by the presence of cotton-seed oil or tallow. Taking the average saponification equivalent of lard as 289, and that of cocoa-nut oil as 219, there is a difference of 70, so that every 0·70 below the higher standard might be taken as indicating the probable presence of 1 per cent. of the adulterant. The sample examined showed a saponification equivalent of 265·2, and for this and other reasons was returned as containing 33 per cent. of cocoa-nut oil.

Filtering Material.

Carbonized sawdust, saturated with certain chemical compounds, has been introduced as a material for filtering or decolorizing liquids (*Pharm. Cent.*, Oct. 25, p. 531). When the object is to remove calcium sulphate from a liquid a sawdust that has been saturated with barium chloride is used, and similarly for the removal of calcium carbonate a sawdust that has been treated with magnesium sulphate and caustic soda. The sawdust intended specially for the decoloration of liquids is first treated with alum and then with sodium carbonate, which cause a precipitation of aluminium hydrate that adheres to the sawdust, which is then washed until the washings give no reaction with barium chloride.

Number of the Elements.

Notwithstanding the frequency with which during recent years announcements have been made of the discovery of new elementary substances, the total of the known elements is usually fixed in the text-books at some number under seventy. It is therefore worth noting that in a list just published (*Chem. News*, Oct. 19, p. 188) of elementary substances announced in the years 1877 to 1887 inclusive, compiled by Mr. Carrington Bolton, there are upwards of sixty items. Among these some are attributed to the alleged breaking up of substances previously thought to be themselves elementary in character, such as didymium, thulium and samarium; the claims of others at present rest solely on spectroscopic indications; whilst probably of many it may be said that their history is already complete. But still it seems likely there may be a residuum survive that will swell the total considerably beyond the highest of the conventional numbers usually quoted.

THE CONSTITUENTS OF WINTERGREEN LEAVES.*

(*Gaultheria procumbens*, Lin.)

BY PROFESSOR DR. FREDERICK B. POWER AND NORBERT C. WERBKE.

The most interesting known constituent of wintergreen leaves is the volatile oil, the characters and composition of which have so frequently been described and discussed that the subject might naturally be considered as presenting but little of interest for further investigation.

Nevertheless, some difference of opinion seems to prevail regarding the exact relation of this oil to the oil of the sweet or black birch (*Betula lenta*, Lin.), and but comparatively little is as yet known of the properties of one of the constituents of the former, namely, the *terpene*.

As is well known, the first extended investigation of wintergreen oil was made by Procter,† but its more exact composition was first determined by Cahours,‡ who not only ascertained the presence of methyl salicylate, but was likewise the first to observe and mention the presence of an accompanying terpene. This may at least reasonably be inferred, from the fact that no notice of the latter body appears in the papers of Procter to which reference has here been made.

According to Cahours,§ wintergreen oil contains 90 per cent. of *methyl salicylate*.

$$C_6H_4{<}^{OH}_{COOCH_3}$$

(not the isomeric methyl-salicylic acid,

$$C_6H_4{<}^{OCH_3}_{COOH},$$

as is frequently erroneously stated), and 10 per cent. of a hydrocarbon or terpene, to which the name *gaultherilen* has been applied. In his investigation the oil was distilled with concentrated aqueous potash, and the distillate, consisting of wood-spirit (methyl alcohol), water and gaultherilen, washed first with water containing potash, then with pure water, and the undissolved oil dehydrated with calcium chloride, and rectified over potassium.

This terpene, or *gaultherilen*, is stated to be colourless, mobile, lighter than water, and to possess a rather agreeable peppery odour. Its composition is given as $C_{10}H_{16}$, with which the recorded analytical data well accord, while its boiling point is stated to be at 160° C., and its vapour density 4:92 (calculated for $C_{10}H_{16}$, 136=4·71). In Fehling's *Neues Handwörterbuch der Chemie*, iii., p. 343, it is recorded, evidently as the result of a more recent observation, that the vapour density of this body is 4·74 (in still closer agreement with the calculated number), and also that HCl is abundantly absorbed by it, forming a liquid of a camphor-like odour, which boils at 185° C.

A very small amount of the terpene has more recently been obtained by Mr. H. P. Pettigrew,‖ but in an impure state, and in so limited a quantity that its properties were not further investigated. The amount found by him was calculated as representing 0·3 per cent. of the original oil.

It is certainly very interesting that a body possessing a pepper-like odour, as described by Cahours, should be associated with so fragrant a compound as methyl salicylate in the natural oil of wintergreen. An opportunity having been afforded us of obtaining a perfectly pure oil of wintergreen direct from the distiller, Mr. Robert A. Wilson, of Black River Falls, Wis., and also having prepared a specimen of the oil ourselves from a choice quality of wintergreen leaves, we were desirous of isolating the terpene therefrom, and of being able to confirm the above-described chemical and physical properties.

Two hundred grams of pure oil of wintergreen were therefore mixed with 60 grams of caustic soda and 200 grams of water, and boiled for about five hours in a flask provided with a reflex condenser, when complete saponification of the ester was effected. The liquid was then further diluted with water, and distilled until oil globules ceased to come over, and the first distillate treated in a similar manner, in order that any terpene dissolved by the water might be separated to the greatest possible extent. A bright yellowish oil, *lighter than water*, was thus obtained, which was dehydrated by means of potassium carbonate. The total amount of this body from 200 grams of the original oil was but 0·62 gram, or 0·31 per cent., being almost precisely the same as that found by Mr. Pettigrew.

The liquid obtained by us, which we must consider to be the *terpene* or *gaultherilen* of Cahours, possesses a pungent, pleasantly aromatic odour, but also strongly recalling that of black pepper. This odour is most apparent when the liquid is diffused by rubbing it on the hand, or when mixed with water, as in the original distillate. Its specific gravity, as accurately as we could determine it with the small amount available, is 0·940, and it does not appear to fulminate in contact with powdered iodine. When one or two drops of the liquid are dissolved in about fifty drops of glacial acetic acid, and a drop of concentrated sulphuric acid is added, it affords a pinkish coloration, but not the handsome violet colour first described by Wallach* as characteristic of the sesquiterpenes, $C_{15}H_{24}$. This, however, does not detract at all from the possibility of its having the molecular composition $C_{10}H_{16}$, which the body in question undoubtedly possesses, since oil of turpentine, as well as some other similar oils, does not afford the above-described reaction. The very small amount of this body at our disposal has unfortunately precluded at present its further chemical examination.

These results, nevertheless, serve to confirm the statement that a body corresponding to the *gaultherilen* of Cahours is present in the oil of wintergreen, although in very much smaller amounts than has hitherto been generally accepted. They also serve to prove that upon the presence of this body depends the difference between the oil of wintergreen and the oil of sweet birch; for whatever may be the varying character of these oils as found in commerce,† we are convinced that the pure oil of birch, as was determined by Pettigrew‡ under the supervision of one of us (P.) consists of pure methyl salicylate.

The specific gravity of the two oils we also believe to be not identical, although both were given by Procter§ as 1·173. A specimen of pure oil of sweet birch in our possession, which is a part of the same oil that was analysed by Pettigrew, we find to have the specific gravity of 1·1819 at 15° C., while an oil of wintergreen, distilled by ourselves from choice leaves, has a specific gravity of 1·1759 at 15° C. Another specimen of oil of wintergreen, distilled by Mr. Robert A. Wilson, of Black River Falls, Wis., has a specific gravity of 1·1747, or, when rectified, 1·1766 at 15° C., but it is always lighter than oil of birch, or pure methyl

* Read before the Chemical Section of the American Association for the Advancement of Science. Cleveland meeting, August 16, 1888. From the *Pharmaceutische Rundschau*, September.

† *Amer. Journ. Pharm.*, vol. xiv. (1842), p. 211, and vol. xv. (1843), p. 241.

‡ *Ann. Chim. Phys.*, [3], x., p. 358.

§ *Ibid.*, and Gmelin's 'Handbook of Chemistry.' Cav. edit., vol. xiv., p. 290.

‖ *Amer. Journ. Pharm.*, 1884, p. 266.

* Liebig's *Annalen der Chemie*, bd. ccxxxviii., (1886), p. 87.

† Squibb's *Ephemeris*, vol. iii. (1887), No. 2, p. 953.

‡ *Amer. Journ. Pharm.*, 1883, p. 385.

§ *Ibid.* 1843, p. 244, and 1842, p. 213.

salicylate, which is not below 1·18. Mr. Kennedy* has stated the specific gravity of oil of birch to be 1·178 (temperature not given), which is certainly not correct for a temperature of 15° C. On the other hand, the correctness of our observation is supported by the statement in Beilstein's 'Organische Chemie,' p. 1432, where the specific gravity of methyl salicylate is given on the authority of Kopp (*Annalen*, bd. xciv., p. 301) as 1·1969 at 0° C., or 1·1819 at 16° C., precisely the same as that we find for oil of birch.

The boiling points of the two oils, on the other hand, is pretty nearly identical. A pure oil of birch was found by Pettigrew, *loc. cit.*, to boil at 218° C., and methyl salicylate is stated by Beilstein, *loc. cit.*, on the authority of Schreiner (*Annalen*, bd. cxcvii., p. 17), to boil at 217° C., under a pressure of 760 mm. An authentic specimen of oil of wintergreen we find to distill quite constantly at about the same temperature, or from 215° to 216° C. This would naturally be expected in view of the very small amount of terpene contained in the latter oil.

In this connection a few notes may also be recorded regarding the yield and production of oil of wintergreen. By the distillation on a small scale of choice fresh leaves, in an air-dry condition, we obtained 2 per cent. of oil. Mr. Underhill,† of New Hampshire, obtained on an average 10 pounds of oil from a ton of the leaves, or but 0·5 per cent.; the maximum yield, however, being 0·7 per cent. Mr. Kennedy‡ states the average yield to be about 0·8 per cent., and Mr. Brakely§ as from 0·66 to 0·8 per cent., or sometimes below 0·5 per cent. Mr. Robert A. Wilson, of Black River Falls, Wis., who has distilled nearly 7000 pounds of wintergreen leaves during the past year, informs us that the yield of oil is very variable, often amounting to but mere traces, and evidently depends upon the time of collection of the leaves and the method of distillation, such as the use of a copper still with direct heat, or a wooden vat with steam heat, etc.

In view of the very limited amount of oil of wintergreen now produced, and that the commercial oil known by this name is apt to be exclusively the oil of birch, or a mixture of the latter with small and variable amounts of wintergreen, we must concur in the opinion expressed by Dr. E. R. Squibb‖ that the United States Pharmacopœia should at least be free from the error of designating this article by a title which no longer correctly indicates its source. Since a synthetical oil of wintergreen is now also an article of commerce, in addition to the two natural oils above referred to, and as all these bodies are so nearly alike chemically, as well as therapeutically, it would seem expedient that in the next revision of the national Pharmacopœia the title methyl salicylate should be adopted. Under this title it would then seem perfectly proper and safe to indicate and recognize as the same medicinal agent either the volatile oils of *Gaultheria procumbens* and *Betula lenta*, or the pure synthetical product.

Other Constituents of Wintergreen Leaves.

Since the publication of the researches of Professor Dr. Plugge, of the University of Groningen in the Netherlands, on the constituents of the leaves of various ericaceous plants,¶ and the isolation of a crystalline, poisonous principle termed *andromedotoxin*,**

* *Amer. Journ. Pharm.*, 1882, p. 52, and *Pharm. Rundschau*, bd. i., s. 222.
† *Amer. Journ. Pharm.*, 1883, p. 197.
‡ *Ibid*, 1882, p. 52; *Rundschau*, bd. i., s. 222.
§ *Ibid*, 1879, p. 440.
‖ *Ephemeris*, 1885, vol. iii., No. 2, p. 954.
¶ *Archiv der Pharm.*, 1883, p. 1, and *Ibid* 1885, pp. 905—917; *Pharm. Rundschau*, bd. iv., 43; and also 'Proc. Amer. Pharm. Assoc.' (1883), pp. 127—129, (1884) p. 149, (1886) p. 646.
** *Archiv für die gesammte Physiologie* [40], pp. 480—500; also *Ber. der deutsch chem. Ges. Referate*, 1888, p. 27.

it has seemed of interest to us to ascertain whether this could also be detected in wintergreen leaves.

For this purpose the aqueous liquid remaining in the still after the distillation of the volatile oil from 1·500 grams of wintergreen leaves was filtered, evaporated to a small volume, and then treated with alcohol, which separated a considerable quantity of *gum*. After separating the latter the alcohol was completely expelled by distillation and evaporation, and the remaining liquid then treated with a solution of normal lead acetate, which precipitated considerable colouring matter. The subsequent addition of basic lead acetate produced a further precipitate, lighter in colour and less in amount. These lead precipitates were thoroughly washed, and reserved for further investigation.

The clear filtrate from these precipitates was deprived of the excess of lead by hydrogen sulphide, evaporated to a small volume, and shaken with seven successive portions of chloroform. Each of these portions of chloroform was allowed to evaporate separately, and left a bitter amorphous residue, but none of them afforded the characteristic colour reactions of andromedotoxin, described by Dr. Plugge, *loc. cit.*, when tested with concentrated hydrochloric, sulphuric, or phosphoric acid, or when evaporated with these acids in a dilute condition. The same negative results were obtained when a little of the residue was dissolved in alcohol and tested with strong hydrochloric acid, as described by Professor Eykman* in connection with the principle termed *asebotoxin*, which is regarded as identical with andromedotoxin.

The residues left by the first three portions of chloroform, when dissolved in water, afforded a bluish-violet coloration with ferric chloride, probably due to *arbutin*. The liquid which had been extracted by chloroform was subsequently shaken with a mixture of 8 parts of ether and 1 part of alcohol; this ethereal solution left on evaporation a bitter residue, which also afforded the characteristic reactions of arbutin.

The original aqueous liquid, as has already been stated by other investigators, is rich in *sugar*, but we did not succeed in satisfactorily isolating the so-called *ericolin*.† The characters ascribed to the latter substance we believe to require further confirmation, as has also been indicated by Professor Huseman.‡

The yellow precipitates produced by lead acetate and subacetate, previously referred to, were suspended in water, and decomposed by hydrogen sulphide. The filtrate from the decomposed lead acetate precipitate contained *tannin* and a colouring matter resembling *quercitrin* in its reactions, which has also been observed by Professor Eykman,§ in the ericaceous plant *Andromeda Japonica*, Thunberg.

Neither of these liquids obtained from the decomposed lead compounds, when treated with chloroform as previously described, afforded any indication of the presence of andromedotoxin or asebotoxin, although the latter, according to Eykmann,‖ is precipitated by basic lead acetate. It may therefore be concluded that the leaves of *Gaultheria procumbens* do not contain andromedotoxin, and in fact no poisonous property has ever been ascribed to them. It would still be of interest to ascertain whether this principle is not contained in some other North American Ericaceæ, which are regarded as specifically poisonous, for sample, the *Andromeda Mariana*, Lin., *Kalmia angustifolia*,¶ Lin., *Monotropa uniflora*, Lin.,** and other allied species.

* 'Proc. Amer. Pharm. Assoc.' 1883, p. 127. *Pharm. Rundschau*, bd. i., s. 111.
† *Amer. Journ. Pharm.*, 1883, p. 468.
‡ 'Die Pflanzenstoffe,' 2nd edition, p. 1128.
§ 'Proc. Amer. Pharm. Assoc.,' 1884, p. 148.
‖ *Ibid*, 1883, p. 127.
¶ Millspaugh's 'Amer. Med. Plants,' fasc. iii., p. 104.
** *Ibid*, fasc. iii., p. 103.

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THE CHEMISTRY OF CACAO BUTTER.

THOUGH the oil of theobroma is not one of the most important medicinal agents which the pharmacist has to deal with in the exercise of his art, there can be no question that the history of the nature and characteristics of any article of the official materia medica must be a subject deserving consideration, and that any advance in such a direction should be within the cognizance of the readers of this Journal. For this reason we take the present opportunity of directing attention to a paper that has recently been published in the *Archiv der Pharmacie* on the constituents of cacao butter, in which Herr PAUL GRAF gives an account of his investigation of that material undertaken with the object of clearing up some doubtful points as to its physical characters and chemical nature. It has been stated that genuine oil of theobroma melts at a temperature ranging between 30° and 33° (*Herbst. Jahresb. der Pharmakognosie*, 1885, p. 291), and the British Pharmacopœia gives the melting point as lying between 30° and 35° C. Oil of theobroma has also been represented as containing no free fatty acid, no unsaponifiable fatty substance and no glycerine compounds of volatile fatty acids. It has also been stated to contain at least one peculiar fatty acid, having a composition represented by the formula $C_{64}H_{128}O_2$, to which the name of theobromic acid has been applied (KINGZETT, *Journ. Chem. Soc.*, 1878, p. 38). As regards the latter point, the investigations of VAN DER BECKE (*Jahresb. der Pharm.*, 1880, p. 137), and of TRAUB (*Archiv der Pharm.*, 21, p. 19), have led to doubt as to the existence of such an acid. It was therefore to the determination of this and the other points above mentioned that Herr GRAF directed his study of cacao butter in the Pharmaceutical Institute at Erlangen. The material for the purpose was obtained from seven different manufactories, and eleven different samples were operated upon. These samples represented the article as it is generally met with in commerce, and only two of them were coloured by the presence of suspended cacao powder so far as to require filtration. The determinations of melting point were carried out in tubes open at both ends and in tubes closed at the capillary end according to the methods in general use. The results obtained with open tubes ranged from 29° to 33°·4 C., and those with closed tubes gave for ten of the samples a melting point of 34°·3 C., while in one the melting point was 33°·5 C. The concordance of these latter results was considered to indicate that the determination in closed tubes was most to be relied upon, and it was inferred that the discrepancies in the statements as to the melting point of commercial cacao butter arose more from the mode of experimenting than from any real difference in the article itself.

The first chemical question investigated was that as to the presence of free fatty acids in cacao butter. For that purpose the method of titration with decinormal soda solution was adopted, as directed by BURSTYN (*Dingler*, 217, p. 315) and MERZ (*Zeitsch. anal. Chem.* 17, p. 390). Careful trials were made to ascertain whether any saponification of glycerine ester took place when that method was followed, and it was found that there was no reason to fear such a result. Besides that method, the determination of free fatty acids was carried out by using for the purpose sodium phosphate. Considering that disodium phosphate has a slight alkaline reaction, and that one sodium atom in the molecule readily combines with an acid so as to produce monosodium phosphate; further, that this takes place even with carbonic acid, it was thought that fatty acids might act in the same way. That was found to be the case, and it was also ascertained that the disodic phosphate had no action upon neutral fats, so that the method could be relied upon to give trustworthy indications as to the presence of free fatty acids. It is necessary to observe that in the titration with disodic phosphate solution the fatty acids must be dissolved in alcohol diluted with one-third water, in order that there may not be separation of fatty acid or of sodium phosphate. Litmus is the only indicator that can be used in these experiments. After numerous trials to ascertain the accuracy of the method, cacao butter was tested in this way, and also by titration with soda solution, the results being in both cases concordant, and showing the presence of a small amount of free fatty acid. This result was further confirmed by the determination of glycerine, which gave 9·59 per cent. instead of 10·33, the amount in tristearin, which is the preponderating constituent of cacao butter. Besides free fatty acids the presence of a substance identical with or analogous to cholesterin was ascertained. This was effected by saponifying the fat with alcoholic soda, converting the excess of alkali into carbonate by a current of carbonic acid gas, and then evaporating the soap solution to complete dryness and extracting the finely powdered residue with petroleum spirit. In this way a yellowish waxy substance was obtained, which was proved to be free

from soap by treatment with hot water. For the further examination of this substance it was heated with acetic anhydride for some hours, and was thus eventually dissolved; but it separated on cooling in a flocculent form. This deposit was collected and dissolved in absolute alcohol, and on evaporating the solution crystals were obtained which showed the form of cholesterin, besides giving the cholesterin reaction when tested with chloroform and sulphuric acid.

For the determination of the presence of volatile fatty acids the cacao fat was saponified with alcoholic soda, the resulting soap freed from alcohol on the water-bath, dissolved in hot water and mixed with excess of dilute sulphuric acid. The separated solid fatty acid was then washed with water until no acid reaction was recognizable. This liquid was made slightly alkaline with sodic carbonate and evaporated to dryness. From the residue the volatile acids were obtained by distillation with dilute sulphuric acid. The distillate thus obtained was turbid, and also contained some solid fatty acid; but the presence of formic, acetic, and butyric acids was ascertained by the formation cacodyloxide and butyric ether, and by the reduction of ammoniacal silver solution. For the investigation of the solid fatty acids and oleic acid, the cacao butter soap was converted into lead soap. This was washed thoroughly, dried, and digested in fine powder with dry ether to remove lead oleate, which was afterwards converted into barium salt, and gave on analysis 19·65 per cent. barium, a result corresponding closely with the composition of barium oleate, containing 19·54 per cent. The separation of oleic acid from the fatty acids obtained by decomposing cacao butter soap with sulphuric acid was effected by submitting the mixture to pressure after previous crystallization from hot alcohol, and three repetitions of this process was thought sufficient for the purpose. The further separation of the solid fatty acids was effected by the method of fractional crystallization, and as it was found that there was a distinct difference in the melting points of the several fractions, the entire mass was divided into four parts. The several parts were then dissolved in alcohol enough to prevent deposition at the ordinary temperature, and each solution fractionally precipitated with magnesium and barium acetate, according to the method of Heintz. The fractional precipitates thus obtained were analysed so as to ascertain the molecular weights of the fatty acids they contained, and as the result of a large number of analyses it was inferred that the solid fatty acids in cacao butter are stearic, palmitic, arachinic and lauric acids. No acid of higher molecular weight than arachinic acid could be detected. The whole of this investigation has been carried out in a very thorough manner, and though the subject matter is not one of any very great importance, it deserves to be regarded as a model of good work of a kind we should be glad to see more frequently produced by young pharmacists in this country. It is mainly for this reason that we have referred to the paper, and given a *résumé* of the chief points contained in it.

The *Chemiker Zeitung*, in speaking of the Salt Union lately formed in this country, expresses the opinion that a commercial monopoly of a mineral which occurs so abundantly, and, as it may be said, everywhere, can only be of ephemeral existence, and anticipates as natural consequences of the eventual failure of this syndicate restricted consumption and excessive over-production accompanied by ruinous competition. At the same time it is considered that the combination will for a time have important effects, and so far as salt employed for industrial purposes is concerned, the price will probably be considerably increased. Such a result would be of doubtful benefit to the alkali industry, and it is the opinion of our contemporary that the salt syndicate will furnish German alkali manufacturers a possibility of exporting their products to the English market. Already it appears that there has been a very considerable rise in the price of salt, and it is reported that white lump salt for exportation has gone up from 8*s.* to 15*s.* per ton. It is also reported that the successful floating of the Salt Union has given a great impetus to the salt trade in Cheshire. It appears that merchants and dealers in all parts of the world are anxious to place their contracts before prices advance further, and hence orders are pouring in so rapidly that some of the larger works are for the first time for years working night and day to meet the shipments for October, which are expected to be the heaviest on record.

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We would take the earliest opportunity of mentioning that the annual Conversazione of the Chemists' Assistants' Association is to be held at the Portman Rooms, Baker Street, on Thursday evening, November 15. There is to be a Concert from 8.30 to 10.30, after which dancing will commence. The growing favour that has been accorded to this gathering in previous years will no doubt be continued to the coming one and ensure its success as one of the most pleasant reunions of the season. The next ordinary meeting of the Association will be held on Thursday evening, November 8, when Mr. A. W. Stokes will read a paper on "The Adulterations of the Breakfast Table."

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On Monday evening next, at nine o'clock, a meeting will be held in the Society's House, 17, Bloomsbury Square, to make preliminary arrangements for the forthcoming Chemists' Ball, at which all gentlemen interested are invited to be present.

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The meetings of the London Section of the Society of Chemical Industry for the present session will commence on Monday, November 5, at 8 o'clock, when the papers to be read will be "On a New Form of Polarimeter for Brewers," by Mr. J. Heron, and "The Comparative Antiseptic Value of Various Chemical Substances," by Mr. C. T. Kingzett.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

October 17, 18, 19, 24, 25 *and* 26, 1888.

Present on the 17th, 18th and 19th—Mr. Carteighe, President; Messrs. Barnes, Blunt, Bowen, Corder, Druce, Fletcher, Gale, Gerrard, Greenish, Ransom, Symons, Tanner, Taylor and Thresh.

Present on the 24th, 25th and 26th—Mr. Carteighe, President; Mr. Bottle, Vice-President; Messrs. Barnes, Blunt, Bowen, Corder, Druce, Fletcher, Gale, Gerrard, Greenish, Ransom, Symons, Tanner, Taylor and Thresh.

Dr. Greenhow was present on the 24th and 26th on behalf of the Privy Council.

MAJOR EXAMINATION.

17*th.*—*Six* candidates were examined. *Three* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Browne, Frank.....Northampton.
Brunyee, Arthur .....Thorne.
Bulmer, Bethel .....Pickering.

24*th.*—*Six* candidates were examined. *One* failed. The undermentioned *five* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Gwillim, Walter Robert.....Abergavenny.
Hogg, John Alexander .....Edinburgh.
Howell, Alfred.....St. Clears.
Mead, Frederick James .....London.
Scott, Richard Forder .....London.

25*th.*—*Six* candidates were examined. *One* failed. The undermentioned *five* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Jennings, Richard Tildesley ...Tewkesbury.
Mander, Alfred .....Coventry.
Spargo, Herbert .....Newcastle-on-Tyne.
Tull, Frederick Charles .....Newbury.
White, William Louis .....Littleport.

MINOR EXAMINATION.

17*th.*—*Twenty-seven* candidates were examined. *Sixteen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Allez, Peter Arnold.....Guernsey.
Barnes, George Arthur .....Heckington.
Blabey, John Robert .....Woolton.
Blomfield, Thomas Nevill ..... London.
Botterill, Frederick William ...Otley.
Bransby, Charles Kirby .....Manchester.
Buddles, William.....Caistor.
Burton, Arthur Lambirth .....Sudbury.
Bushby, Arthur .....Manchester.
Carter, Thomas..... ....Hereford.
Marsden, Frederick Steele .....Snaith.

18*th.*—*Twenty-eight* candidates were examined. *Fourteen* failed. The undermentioned *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Adam, James Bell D. .....London.
Clayton, John James .....Oswestry.
Coates, Arthur .....Belper.
Collis, Charles Bertram ....Plymouth.
Comyns, Joseph Robert .....Maryport.
Davy, Harry Richard .....Leicester.
Dawson, William Thorndick ..Norwich.
Dodge, Edmond .....London.
Donaldson, George .....Portsea.
Drabble, Thomas Lambe .....Holbeach.
Drinkwater, James Wilson ...Beswick.
Duff, William .....New Thornton Heath.
Eyles, John Robert.....Newbury.
Richards, Harry .....Blandford.

19*th.*—*Twenty-seven* candidates were examined. *Twelve* failed. The undermentioned *fifteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Enoch, Albert John.....Newmarket.
Furney, Frank.....Warminster.
Galloway, William Hearfield...Harrogate.
Gantlett, Henry.....Wolverhampton.
Gorfett, William Thomas .....Portsea.
Grayson, John Henry.....Whitehaven.
Hatfield, George William.....London.
Hebbeler, Karl.....London.
Hender, Walter Coad.....Plymouth.
Hill, William Henry.....Wolverhampton.
Jackson, Frederick William...Blackpool.
James, William Montford.....Market Drayton.
Johns, Thomas.....Woolwich.
Kerridge, Herbert Malster.....Ipswich.
White, James Carter.....Grimsby.

24*th.*—*Twenty-seven* candidates were examined. *Fifteen* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Knighton, Thomas William...Staveley.
Knowles, Louis.....Leicester.
Lewis, David John.....Aberystwith.
Madge, Hubert Abraham.....Ottery St. Mary.
Martin, William Morley.....Redruth.
Milligan, George.....Manchester.
Moore, James Temple.....Southsea.
Neale, Frederick Herbert.....Liverpool.
Palmer, James.....Oxford.
Parker, Charles Frederick ...Liverpool.
Pasco, George Sidney .....London.
Roberts, Griffith .....London.

25*th.*—*Twenty-five* candidates were examined. *Eleven* failed. The undermentioned *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Allwood, William Henry .....Wellington.
Johnstone, Edward Straus ...Whaley Bridge.
Kingston, George Thomas.....Bath.
Roberts, William Arthur .....Bangor.
Rogers, Ernest Henry.....London.
Rudd, Henry Bulmer .....Bradford.
Seccombe, Charles William ...Southampton.
Slater, Edwin .....Blakenhall.
Stent, Frederick Richard .....Bath.
Sturges, Francis William .....Belgrave.
Sugden, Stephen Hale .....St. Anne's-on-Sea.
Surfleet, Arthur George .....Gainsborough.
Taylor, William Carey .....Southport.
Toone, Arthur Henry .....Warminster.

26*th.* — *Twenty-eight* candidates were examined. *Twelve* failed. The undermentioned *sixteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Aukland, William Henry .....St. Mary Cray.
Colebank, John .....Carlisle.
Harding, Henry Gladstone ...Ealing.
Hepworth, John Stafford .....Hyde.
Loxley, Charles Herbert .....Doncaster.
Smith, Sidney .....Birmingham.
Tomkins, William Kingston...Oxford.
Walmsley, George .....Kingston-on-Thames.
Wansbrough, Edwin G. L. ...Barrow-in-Furness.
White, Woolmer R. Donati ...Landport.
Wilkerson, Albert Henry ..... Epsom.
Willsher, Charles Garrett .....Dover.
Wiseman, David William .....London.
Wood, John Beaumont .....Huddersfield.
Woodcock, Thomas John .....Norwich.
Woolley, Evan Edward G. ...Llanidloes.

PRELIMINARY EXAMINATION.

26th.—Certificates by approved examining bodies were received from the undermentioned in lieu of the Society's examination:—

Axe, William John .....York.
Blyth, Wm. John Bucktrout ...Sunderland.
Booth, William John .....Northampton.
Boyton, Arthur James Henry...Forest Gate.
Burrell, Benjamin Lawson ...Leeds.
Chettle, Herbert Tovey .....Trowbridge.
Evans, Emily Jane .....Brynmawr.
Hall, James Ralph .....Bath.
Jones, Alfred Morgan.....Cefn Coed.
Jones, Jorwerth .....Llangollen.
Moss, John Henry .....Whitehaven.
Peel, August.....Stoke Newington.
Platt, William George ..... Matlock Bath.
Ridlington, Walter Newton ...Kennington.
Ryan, Walter Thomas.....Jersey.
Sandoz, Georges .....London.
Saunders, William John.....Strood.
Simpson, Frederick Arthur ...Cambridge.
Taylor, Charles John .....Sandgate.
Watkins, David .....Pentyrch.
Wells, William..... ..Islington.

26th.—The Report of the College of Preceptors on the examination held on October 9 was received.

Two hundred and sixty candidates had presented themselves for examination, of whom *one hundred and twenty-one* had failed. The following *one hundred and thirty-nine* passed, and the Registrar was authorized to place their names on the Register of Apprentices or Students:—

Abbott, John .....Lazonby.
Ahier, Ernest .....Jersey.
Alcock, James Elsworth .....Sheffield.
Armbrecht, Ernest L. Nelson...London.
Arrowsmith, Fredk. Charles ...Newcastle-on-Tyne.
Ashford, Frederick Charles ...Northampton,
Ball, William Henry .....Newcastle, Staffs.
Batty, Thomas Edward .....York.
Belbin, Harry Ashley.....Sheffield.
Bell, John .....Dumfries.
Bell, Robert William .....Newcastle-on-Tyne.
Bentley, Charles Saville .....Sheffield.
Bloor, Frederick Arthur .....Southport.
Blount, George Wright.....Newcastle-on-Tyne.
Brack, David George .....South Shields.
Brewer, Walter Joseph .....Redhill.
Brigham, John George .....Thornton Watlass.
Broom, G. A. C. .....Llanelly.
Brown, Christian Charles .....Tintern.
Brown, William James .....Dover.
Brownbill, Edward .....Wakefield.
Burgess, Frederick William ...Wigan.
Burgon, Joseph Lockwood ...Bradford.
Burn, George .....Arbroath.
Burnett, William.....Montrose.
Capper, Arthur.....Liverpool.
Carter, Joseph Thomas .....Middlesborough.
Clay, Arthur.....Leeds.
Clay, David Lloyd .....Holyhead.
Cockrill, James Shattock .....London.
Cole, William Henry .....Bristol.
Coleman, John Harold .....Wolverhampton.
Connal, William .....Greenock.
Cooch, Wm. Albert Brooks ...London.
Cowan, Hugh .....Ayr.
Cripps, Ernest Charles .....Maidenhead.
Crombie, James .....Perth.
Curtis, John .....Newport, Salop.
Davies, Philip Percival .....Tunbridge Wells.
Davies, William George.....Cardiff.
Doggart, Robert Hamilton.....Perth.
Douglas, Frederick Albert.....Wigan.
Douthwaite, Frank .....Beverley.
Duckworth, William .....Bradford.
Eedes, John Westmacott .....Gondhurst.
Egginton, John Tertius ....Sedgley.
Ellington, Charles Sampson ...Rochester.
Ellis, William Neale .....Peterborough.
Freeman, Arthur Owen..... ...Brierley Hill.
Galloway, Philip Henry.....London.
Goldsworthy, William .....London.
Gordon, Richard Munro.....Elgin.
Gregory, John ... .Stockton-on-Tees.
Hair, Lewis .....Derby.
Hall, John Arthur .....Coventry.
Hare, James Archer .....Hexham.
Harry, Benjamin.....Carmarthen.
Hastwell, Wilbye.....Kendal.
Hatton, Foster James.....Weymouth.
Heath, Harry Llewellyn.....Alcester.
Henderson, James Jamieson...Edinburgh.
Hill, Lawrence.....Sheffield.
Hough, Thomas .....Northwich.
Hoy, Charles.....Cupar Fife.
Hughes, William..... .....Birkenhead.
Hume, John ....Dalbeattie.
Humphreys, Griffith Richard ..London.
Hunter, Oliver.....Wigan.
Jackson, William Kendall.....Bradford.
Jenkin, James .....High Wycombe.
Johnson, Walter Thomas .....Birmingham.
Judd, Walter Rossell ....Liverpool.
Kirk, Alphonsus Jos. Edwd....Ramsey, Isle of Man.
Kirk, John .....Alloa.
Knight, John William .....Leicester.
Lambert, Ernest Harold .....Farsley.
Lane, Arthur Robert .....Nottingham.
Lean, Henry Sproston .....Liverpool.
Leefe, Bernard Wrapson .....Malton.
Lockett, Frank .....London.
Lodge, Fred.....Wakefield.
McLeish, Edward .....Lochee.
McPherson, Fredk. Charles ...Burghead.
Mannifield, William .....Sheffield.
Mannox, Gertrude Annie .....Sutton Coldfield.
Maxwell, John .....Kelso.
May, George Howard.....Marlborough.
Menzies, George Wilson.....Dalbeattie.
Murray, William .....Middlesborough.
Myers, Gabriel.....Brough.
Neathercoat, Harry William...Ely.
Nicolson, David Walker.....Edinburgh,
North, Guilford Dudley.....Barton-on-Humber
O'Reilly, Thomas.....Bracknell.
Pain, William John .....Oxford.
Pearce, William Forward .....Brixham
Pettingell, Frank Ernest .....Hull.
Pimlott, Thomas Herbert .....Eccles.
Plant, Walter Edward .....Rugby.
Prickett, Owen.....Burry Port.
Priestley, John Andrew .....Laisterdyke.
Pughe, Robert .....Machynlleth.
Purdy, James William .....South Shields
Read, Harold McLain .....Alnwick.
Richards, Gwendoline Edith...Bangor.
Roberts, Francis William .....Banbury.
Roberts, William Edward .....Menai Bridge.
Rogers, Jos. Edwd. Gilbert ...London.
Roper, Frederick George .....Kendal.
Routley, Owen.....London.
Russell, John .....Glasgow.
Shaw, Robert .....Sheffield.
Shove, Bertha .....London.
Simpson, Langham Dale .....Berkhamstead,
Sloan, Charles Alexander .....Dumfries.
Smith, Alfred Jason .....Gloucester.
Stead, Samuel Blower..... .....Widnes.

Stephens, Frank Robert.....Clevedon.
Stone, Ernest Sidney.....Hastings.
Stones, John Whitehead .....Manchester.
Stratton, Godwin .....Newport, I. W.
Taylor, William Stewart ... ..Buckie.
Thorpe, Arthur Muxlow.....Spalding.
Urry, John Francis.....Birmingham.
Walker, George ....Keith.
Wallwork, James.....Tyldesley.
Wardley, Thomas .....Dalton-in-Furness.
Wheeler Ernest John.....Eastbourne.
Williams, James .. ..Carmarthen.
Williams, William George.....Southport.
Willis, Charles Alfred .....Lindley.
Wilson, George Clark.....Glasgow.
Windle, Clarence Parker .....Bury.
Withers, John Thomas .....Haslar.
Wolstenholme, William.....Sheffield.
Wood, Ernest Thomas .....Stonehouse, Devon.
Woodward, John Thompson ...Hull.
Wrench, Frederick William ...Silverdale.
Wright, James Geddes .....Kirkcaldy.

The questions set at this examination were published in the *Pharmaceutical Journal* for October 13, p. 290.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	5	3	2	Lancaster	5	3	2
Birmingham	14	8	6	Leeds	14	9	5
Brighton	4	2	2	Lincoln	1	1	0
Bristol	11	4	7	Liverpool	14	10	4
Cambridge	5	1	4	London	28	15	13
Canterbury	4	3	1	Manchester	16	7	9
Cardiff	3	1	2	Newcastle-on-T.	13	7	6
Carlisle	8	4	4	Northampton	4	2	2
Carmarthen	8	4	4	Norwich	1	0	1
Carnarvon	5	4	1	Nottingham	7	3	4
Cheltenham	6	1	5	Oxford	5	3	2
Darlington	6	4	2	Peterborough	2	1	1
Dundee	8	5	3	Sheffield	9	6	3
Edinburgh	11	4	7	Shrewsbury	2	1	1
Exeter	4	2	2	Southampton	6	4	2
Glasgow	11	7	4	Truro	4	0	4
Hull	7	5	2	Worcester	3	1	2
Inverness	2	1	1	York	3	2	1
Jersey	1	1	0				

The following particulars respecting this examination have been supplied by the College of Preceptors:—

Preliminary Examination.

October, 1888.

At this examination, of the 260 candidates examined 139 passed and 121 failed.

249 candidates were examined in Cæsar.
11 ,, ,, ,, in Virgil.

Of the 121 candidates who failed,
58 failed in one subject only;
41 ,, ,, two subjects only;
16 ,, ,, three subjects.
6 obtained the required marks in each subject, but failed to secure the pass aggregate.

Of those who failed in one subject only,
23 failed in Latin;
29 ,, ,, Arithmetic;
6 ,, ,, English.

Of those who failed in two subjects only,
23 failed in Latin and Arithmetic;
6 ,, ,, Latin and English;
12 ,, ,, Arithmetic and English.

Of the 121 who failed only 9 succeeded in obtaining the required pass aggregate.

Of the 40 failures in English 15 are attributed to bad spelling.

At two of the centres there was the clearest evidence of copying in arithmetic. One was a very flagrant case, all the four candidates at the centre having apparently been able to communicate freely with each other during the examination in arithmetic. At this centre *all* the four candidates in consequence failed.

Provincial Transactions.

LEEDS CHEMISTS' ASSOCIATION.

The twentieth Annual Meeting of the above Association was held in the Church Institute on Oct. 18, Mr. Peter Jefferson in the chair.

The annual report and balance sheet were read and adopted. Financially the position of the Association was shown to be satisfactory, the receipts being £1 3*s.* 10*d.* in excess of the current expenses. The number of members was reported to be three in excess of the previous year. Reference was also made to the educational scheme, which has now been in operation for some five years, the first two years of which were devoted to lectures in materia medica, pharmacy and pharmaceutical chemistry by Mr. W. Elborne. Subsequently to the termination of these lectures a two years' course of study in botany, elementary chemistry and physics was sketched out and recommended to the associates, both day and evening classes being available. During this period no lectures in technical subjects were given by the Association. For the present session 16 entries have been received for materia medica and 14 for pharmaceutical chemistry, conducted as before by Mr. Elborne.

The following elections took place:—President, W. Smeeton; Vice-President, J. Abbott; Hon. Treas., J. Hirst; Hon. Sec., F. W. Branson; Council: P. Jefferson, W. D. Pollitt, S. Taylor, E. Yewdall, Geo. Ward, M. F. Greasley.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The opening meeting of the eleventh session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on the evening of Wednesday, October 24, at 9.15, Mr. George Coull, President, in the chair. There was a very large attendance.

Letters of apology for absence were received from Provost Watt Haddington, Vice-Chairman of the Executive of the North British Branch; and Messrs. J. B. Stephenson, Chairman of the Scotch Board of Examiners; G. D. Mackay, Edinburgh; and John Nesbit, Portobello.

The minutes of last meeting having been read and approved, Mr. Coull delivered the following—

Inaugural Address.

Gentlemen,—According to use and wont, it is my duty and privilege to address you to-night from this chair. The first part of my duty is to thank you very heartily for the high honour you have conferred on me in electing me President of this Association, a duty I was debarred from performing by my absence from the last annual meeting. I shall do my best to, and I hope I shall merit the confidence you have reposed in me. My second duty is to bid, in the name of the Association, a cordial welcome to all here to-night, and to express the hope that you will continue to come and help to keep up our attendance. I should like, from personal motives, this, our eleventh year, to be at least as success-

ful as any of its predecessors. You all know the Belgian motto, "Union is Strength," and if you, the members, do not unite with the executive in assisting, by every means in your power, the progress of the Association, which you can do by attending regularly and joining in the discussions, our advance must cease, and we shall fall from the high position we now occupy.

It is within my own knowledge that some among us ask what good the Association does. Well, when within our own ranks we find men who can ask such a question as that, I think there is room for remark by way of enlightenment.

When we find suggestions made by our members adopted in the Pharmacopœia, when we find we are cited as a model Association and copied by others, when we look at our prize schemes for apprentices and find the amount of good we are doing in stimulating the younger members to study, when we look at the friendships which have sprung up through members being brought in contact with each other by attending our meetings, friendships destined to be life long, I trust, then, I think, we may safely say our existence is not in vain.

Now, gentlemen, I wish to make a few remarks, which are rather disconnected, I am afraid, on some subjects which concern us very closely.

Sir Henry Roscoe in his admirable inaugural address to the students at Bloomsbury Square, just gave expression to my thoughts, and in a manner I cannot hope to imitate. He said that in his opinion the examination is only the hall-mark and the teaching the true gold. And, notwithstanding the support given by one of our trade journals to the view that the knowledge obtained is the true gold, I incline to the former opinion. For it must be admitted that many cram up to pass an examination and do pass, and yet have a very hazy idea of their subjects; so if you put a hall-mark on that kind of knowledge, I think it is a false hall-mark.

Now, in going through a complete course in any subject you have more chance, if you study your lectures regularly, of gaining a mastery of your subject than you would have in a much more extended course of private reading. The lecturer emphasizes the salient points, pays attention more to general principles than to mere isolated facts, and leaves out a great deal of useless detail with which you would otherwise burden your mind. Besides, you have a certain amount of ground gone over every day, and no considerations whatever ought to prevent you from learning what you have heard during the day.

If there is no need of training to ensure proper qualification, why have an apprenticeship of four or five years, when all that is really learnt could be learned in eighteen months or two years? Apprenticeship is to ensure proper qualification. Similarly, a curriculum would do much to ensure better qualification than at present exists. I do not say the examinations are not sufficient to ensure safety to the public. I believe they do that, but if we are to advance with the times the curriculum must come. I am not acquainted with the historical aspect of the case in 1868, but I can picture to myself the outcry there probably was when the examinations were first made compulsory, and so history repeats itself.

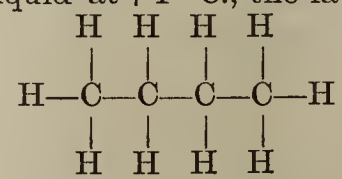
Now, in my opinion, the only way to cope with the stores is to raise the *status* of the drug trade and show the public we are more worthy of their confidence than the stores. Therefore, go in for the examinations as soon as possible, Preliminary, Minor and *Major*. The Preliminary ought to be passed immediately on leaving school. When the Major is passed keep up your knowledge of old drugs and increase your knowledge of new ones, and so gain the confidence of medical men, and the confidence of the public will soon follow.

Of course there are people whose confidence it is no use trying to gain. People who will pass the door of a man who sells Pears' soap at fourpence-halfpenny, expend twopence in cars to and from a store where it is sold for threepence-halfpenny, and come home perfectly happy with their bargain, forgetting that they have lost one penny on the transaction. Such people are found everywhere.

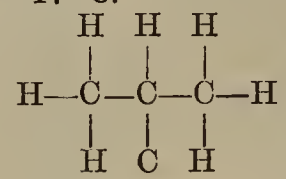
With regard to new remedies, there are so many of them continually being introduced and some of them are so expensive, that it is not advisable to keep too large a stock of them, especially as the properties they are said to possess often exist only in the minds of the discoverers. Sulphonal, I am informed by a gentleman, takes six hours to act, so that if it is desired to put a person to sleep at bedtime a dose must be given about tea-time. If such is the case I do not predict an extensive use for it. Paraldehyde, chinoline, urethane and some others had a short-lived popularity, if I mistake not. But remedies like antipyrin, antefebrin, cocaine hydrochlorate, etc., which have stood the test of time and experiment, and are largely used, ought to be kept, and their history, properties and preparation studied. It is very convenient for the busy medical man to get any information like that from the pharmacist, and it will do much to increase his esteem for and confidence in the latter.

There can be no doubt in the minds of any who have watched the progress of events in the pharmaceutical world that the remedies of the future will be mainly composed of those new synthetical products which at present come chiefly from Germany.

It is more than twenty years ago since Crum Brown and Fraser, both at present professors in our own university, showed the connection between chemical constitution and physiological action. Most of you know something of the connection between chemical constitution and physical properties, as *e.g.*, in the marsh gas series of hydrocarbons, the boiling point of the liquid members of the series rises about 19° C. for every increment of CH_2. It is also a fact that hydrocarbons with long formulæ are not so volatile as those with compact formulæ, *e.g.*, normal butane is not so volatile as isobutane; the former can be condensed to a liquid at +1° C., the latter at —17° C.



Normal butane.



Isobutane.

These examples could be multiplied, but they will suffice. Well, Professors Crum Brown and Fraser, experimenting with strychnine, showed that by modifying its chemical constitution by replacing a hydrogen atom with methyl they altered its physiological action, changing it from a convulsive poison which would tetanize the spinal cord into one which would paralyse the motor nerves. This was the beginning of the new era in pharmacy when we shall be able to form compounds to have any action we please. It seems rather an extravagant idea that things are tending that way, and Mr. Dott and Dr. Stockman are helping to hasten the time, as witness the papers by them read at the Conferences last year and this.

I cannot here enter into a full discussion of this deeply interesting question, but a few remarks may not be inappropriate.

Dr. Lauder Brunton likens the action of drugs on the human body to the action of a man trying to transfix with a flesh-hook various pieces of meat in a pot. It was the custom of the sons of Ely when they were priests in Shiloh, to send their servants with a flesh-hook having three prongs, which he struck into the pot of any man who was offering up a sacrifice;

and all that the flesh-hooks brought up the priest took for himself. Now it would depend on the contents of the pot and the kind of hook employed what the priest's man brought up. With the small pots they were likely to have in Shiloh it would not matter what kind of shank were used; but in larger pots it would matter very greatly, for with a short handle one would not reach the nice pieces lying in the middle of the pot, while with a long one the hooks would go plunging right through to the other side.

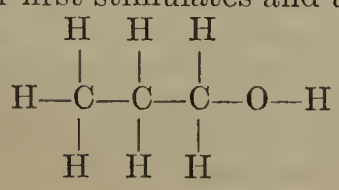
Without going into further details let us look at the action of the chlorides of sodium, potassium and rubidium. Let the metal represent the shank and the chlorine the hook. Sodium has the atomic weight 23 and is too short to reach the important parts to be got hold of, rubidium equals 85 and is therefore too long, going right through them without laying hold of any, while potassium equals 39 and is just the proper length. Now what do we find in reality. Why that the chlorides of sodium and rubidium circulate in the blood without doing any harm, while chloride of potassium is a powerful muscular poison. This is attributed to the differences in the atomic weights. The periodic law, which states that elements with similar chemical and physical properties occur at regular intervals, will probably greatly assist in determining what bases to use for certain purposes, as it is not too much to suppose there will be a physiological connection between them as well.

Again, suppose the nature of the hook were changed, then you would get hold of different pieces of flesh, according as it was blunt or sharp. Let bromine or iodine replace the chlorine and note the effect. The chlorides circulate in the blood without producing any ill effects, so far as the chlorine is concerned. Bromine representing a sharper hook acts on the blood and nerve centres, *e.g.*, bromide of sodium is given in sea sickness and bromide of potassium as a sedative when the brain is excited. Iodine representing a still sharper hook tends to affect the muscles and glands, *e.g.*, iodide of potassium is prescribed in chronic rheumatism and iodide of sodium in glandular swellings.

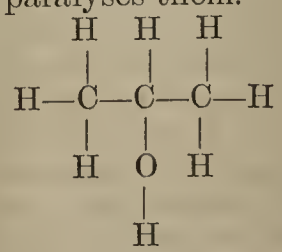
In the alcohols, also, we have a good example of the physiological effect of modifying their chemical constitution. All alcohols attack the nerve centres, paralyse the brain, the spinal cord and centres of life in the medulla oblongata. The medulla oblongata is that part of the brain which, along with the cerebellum, co-ordinates and directs bodily motion, and the visible effects of its temporary paralysis are pretty obvious even to the most dense observer, especially about the new year time, being characterized by the generally wobbly movements of the lower extremities as if they had no connection with the man they belong to.

All the alcohols cause death if taken in sufficient quantity, and the higher you ascend a normal series, *i.e.*, for every increment of CH_2, the more poisonous they become.

Again, secondary alcohols, where the hydroxyl is not attached to a terminal carbon atom, first stimulate the nerve centres and then paralyse them. As an example, take the case of primary and secondary propylic alcohol; the former paralyses the nerve centres, the latter first stimulates and then paralyses them.



Primary propylic alcohol.



Secondary propylic alcohol.

All the carbon compounds formed on the principle of an open chain, as, *e.g.*, the paraffin series of hydrocarbons and its derivatives, appear to have an action more or less like that of alcohol, though the nature of the substances which replace the hydroxyl group or hydrogen atoms modifies this action. Thus marsh gas, alcohol, ether, chloroform and iodoform all tend to paralyse the nerve centres and to exert an anæsthetic action; but look at the effect the substances which tip the free affinities of the carbon points have. The chlorine in the chloroform tends to make it paralyse the heart more rapidly than marsh gas, alcohol or ether, which contain hydrogen alone or hydrogen and oxygen; and in iodoform the effect of the iodine overpowers that of the carbon and hydrogen.

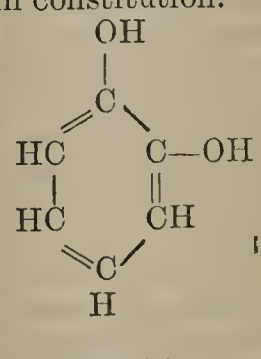
The discovery by Liebreich of one of our most valuable hypnotics, namely chloral, was due to his knowledge of the fact that similar carbon compounds possess a similar anæsthetic action.

Let us pass now to another great group of carbon compounds, in which we have the carbon atoms not arranged in a long open chain but in a ring. This group is called the aromatic or benzene series. The members of it differ from those of the paraffin series in stimulating the nerve centres and producing convulsions before paralysing them; but their most marked property is their power of reducing temperature and destroying low forms of life, so that they act both as antipyretics and antiseptics.

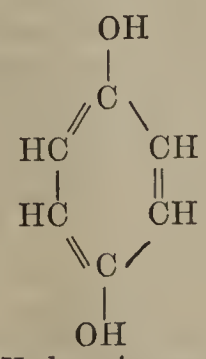
Now let us look at the physiological effect of changing their chemical constitution.

In phenol, commonly called carbolic acid, though it has no action on blue litmus, we have an extensively used and very good antiseptic. It is, as you are aware, an alcohol formed from benzene by replacing one of the hydrogen atoms by hydroxyl. Well, when these hydrogen atoms in phenol are replaced by methyl, the antiseptic power increases and the increase is proportional to the number of methyl groups introduced. Dr. Lauder Brunton explains this increase in antiseptic power by his analogy of the flesh hooks. He says the hydrogen atoms in phenol are like short blunt prongs, and the methyl group is like a chain with a sharp point which goes swinging through the pot and lays hold of everything, while the short blunt hydrogen atoms cannot reach all the lower forms of life.

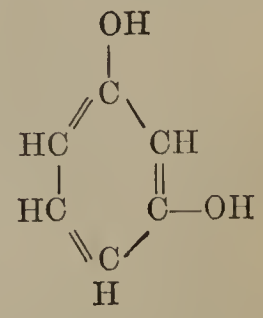
Again, there are three bodies which have a strong antiseptic action, but not equally powerful. They differ from phenol in having two hydrogen atoms in benzene replaced by hydroxyl. I refer to the isomeric bodies pyrocatechin, resorcin and hydroquinone, of which resorcin has only one-third the strength of pyrocatechin and one-fourth that of hydroquinone. These bodies have all the same chemical composition, but not the same chemical constitution, differing from each other in the position of the hydroxyl groups. In pyrocatechin they are close together, in hydroquinone they are as far apart as they can get, and in resorcin they occupy an intermediate position. The difference in antiseptic power is said to be due to their difference in constitution.



Pyrocatechin.



Hydroquinone.



Resorcin.

These bodies, though good antiseptics, sometimes act in a way they are not intended to act, affecting the nervous system and circulation. This is attributed to their simple structure. Attempts to discover substances having a more specialized action, and having a similar but more complicated structure, led to the introduction of antipyrin, the best antipyretic we at present have.

Kairin and thallin were brought forward at the same time, but after a short trial they were discarded. Kairin, Martindale says, is so persistently nauseous that no patient at the London Fever Hospital could be prevailed upon to take a second dose in solution.

A question which has puzzled people for a considerable time now arises. Why is it that nearly all these new synthetical products come from Germany? Sir Dyce Duckworth in his inaugural address last year says he doubts whether our younger pharmacists pursue their science with the energy and thoroughness of their French and German *confrères*. I do not agree with that at all. For my part I think that on an average our countrymen are as hard workers as any men living. Sir Henry Roscoe, however, states the reason very plainly; he says, "It is simply because a more ample opportunity is given to him for the study of chemistry in its higher stages and in its application to pharmacy than has hitherto been accorded to us." The gentleman who gave the inaugural address to the North British Branch last session told me the other day that in answer to an advertisement for a chemist for an alizarin manufactory there was not a single applicant, and they had to send to Germany for one. His theory was that it was a case of "survival of the fittest." He did not say whether the fittest as regards ability or the fittest to live on a small salary. I think he must have meant the latter, for as Sir Henry says, "the notion that he is more gifted may be dismissed as absurd."

On the question of examinations I should like to say a few words.

Firstly, then, there has been for many years a standing grievance among men going up for the Minor examination, which I was happy to see touched upon in the above mentioned inaugural address. I refer to the delightful vagueness of the syllabus and the frequent repetition of the words *et cetera*. It is well known that the Minor examination is not a bit like what it was when the syllabus was framed. I think that any disadvantages of a complete syllabus would be more than counterbalanced by the good it would confer on men reading by themselves, under our present regulations, especially in the country. It was no use to suppose our feeble wail would be paid attention to by the Council, but some consideration will no doubt be given to the weighty words of one of the honorary members of the Society.

Secondly, and this I know will be very unpopular with many, our Preliminary examination requires reorganization. It requires to be made a little stiffer and the scope of it widened by the introduction of say, elementary mathematics, elementary mechanics, French and German. I do not say make them all compulsory, but increase the number of subjects and make some optional. It has been stated on good authority that the day is not far distant when chemistry will be treated by mathematical methods. So gird up your loins, young men, and prepare yourselves. Moreover as a general training for a mind to reason in the abstract, a course of mathematics is invaluable. Then, again, a knowledge of French or German is very useful if you dispense many continental prescriptions, or if you, having scientific proclivities, desire to consult original papers in these languages.

Thirdly, I see no objection to call in the services of eminent teachers as examiners. I do not mean especially teachers in schools of pharmacy, but men proficient in their own particular science. The scheme works well in our universities, and would work well with us, I have no doubt.

There was a circular issued some time ago asking members to vote against the admission of a certain teacher to the Council. This circular had the names of several well-known and true pharmacists appended to it, which probably caused it to receive more attention than it would otherwise have done. For my part I think a *good* man having an intimate acquaintance with educational matters would be a distinct acquisition to the Council. It must be understood that by the bye-laws of the Society anyone being on the Council is ineligible to be an examiner, so he could not possibly have any power to affect the examinations in any way. Observe, I am not speaking in favour of the gentleman referred to in the circular, because I do not see in him any *special* fitness for the position. I wish rather to point out the absurdity of the conduct of those gentlemen who are blackballing a man simply because he is the head of an educational establishment for pharmaceutical students.

Fourthly, and this is now become axiomatic with everyone, examinations are necessary evils in the present state of civilization. I have already explained my views on the subject of the curriculum. I think it would be a great step in advance. I received some time ago a prospectus of the School of Pharmacy, and an accompanying circular stated that the Council was looking forward to the time when similar courses of instruction would be established in various centres of Great Britain. It may look forward (I look forward myself), but that will do no good unless some action is taken in the matter and schools subsidized. I had an opportunity the other day of seeing through the new lecture room and the commodious and nicely fitted up laboratory attached to the Royal Dispensary, which seems to me a good specimen of what these schools should be like.

Now, gentlemen, I have just a few words to say to our younger members. To young men entering the trade I wish to say that they should not think anything they are asked to do is too lowering for them. A course of bottle washing, shop dusting and scales polishing is quite as necessary for their future success as courses of chemistry, botany and materia medica.

It is usually the boy who makes his shop bottles and scales shine most brilliantly that gets on best in life.

Attention to trifles and the cultivation of your natural powers of observation have been inculcated times and again. Observe, record, communicate. If Sir Isaac Newton had not *observed* the apple fall we should not have had the law of universal gravitation. The same great physicist *observed* that substances with a high refractive index were all combustible. He noticed that the diamond has a high refractive index, and so predicted its combustibility years before it was actually shown to be combustible.

We must remember that besides our private life we have all a public life to live and a public duty to perform towards our fellow men. And by communicating our results in any subject, no matter how trifling, we are doing good to others by giving them the benefit of our experience. If it were not that there are found men among ourselves who find time and take the trouble to do that, I wonder what sort of book our standard work published "By Authority" would be. I am afraid that many useful little details would be absent, details which ensure more desirable and perfect products. One illustration will do.

A short note was read at one of our evening meetings some years ago in which the author Mr. Boa advised the addition of a little tragacanth in the preparation of confectio sulphuris. Well, I have no doubt a great many who heard him did not think much attention would be paid to it. I confess I was among the number; but in the new edition of the Pharmacopœia, under confectio sulphuris you will see that there is a certain proportion of tragacanth added in order to suspend the sulphur and cream of tartar.

There is a part of our studies which gives great scope for our powers of observation and which does not receive the attention it deserves. I refer to preliminary examination of unknown substances.

Most young men when handed anything to analyse, at once proceed to dissolve it and take it "through the chart," as the saying is. What an amount of unnecessary trouble they would be saved if they *observed* a little more.

For instance, a candidate is handed a red powder, mercuric iodide say, and asked what it is. If, instead of dissolving it and proceeding in the usual way to take it through the inevitable chart, he simply heated it, he would see at once by its characteristic change of colour from red to yellow that it was mercuric iodide. Again, suppose he gets a white powder which he thought was oxide of zinc, he could tell at once whether it was so or not by again simply heating. Examples like these could be extensively multiplied.

Also *experiment*. I do not mean by that to blow up the back shop, making coloured fires, and so on. But if you think you can make anything, any pharmaceutical preparation, better than it is usually done, or if you can improve the mode of manufacture, try to do so. Make it in different ways and under different conditions, and record your experiments. It does not require any elaborate apparatus to do that sort of thing. And as an example of what may be done in pure chemistry with little apparatus by a pharmacist, take Scheele's researches in organic chemistry. All his classic researches on the organic acids were conducted in a little pharmacy in Sweden, and there he laid the foundation of the chemistry of the organic acids. A popular illustration of the value of experiment is Franklin's experiment with the kite. He wished to establish a parallel between lightning and electricity, and to do so he wanted to attract electricity from the clouds. His idea was to draw the electricity from the clouds by means of a pointed rod. Before the erection of his rods, he had the happy idea of flying a kite provided with a metal point. This he did one stormy day in a field near Philadelphia. The kite was flown with ordinary pack-thread, at the end of which was a key, and attached to the key was a piece of silk thread for the purpose of insulating the apparatus.

On first presenting his hand to the key he got no spark, and was despairing of success, when rain having fallen the cord was rendered a good conductor and a spark passed. He describes his emotion as so great that he could not refrain from tears. If he had not conducted this simple experiment, the connection between lightning and electricity might not have been shown for many years. Illustrations like this could be multiplied also, but I shall only become tedious by so doing.

When your time of probation as junior apprentice is over you will get on to more congenial work, where your powers of observation may be further cultivated and utilized for your future benefit and the benefit of others. Many masters in Edinburgh, at any rate, nowadays allow their apprentices time to attend courses of instruction in chemistry and botany, as being the more important subjects. Materia medica, as usually treated by lecturers, includes therapeutics or the actions of drugs, with which we are not called upon to exhibit any special acquaintance. All praise to those masters who give their apprentices time for such a purpose. They truly have the interests of their apprentices at heart. For those who cannot get away through the day, there is that admirable institution, the Heriot-Watt College, which is largely attended, and in increasing numbers, by pharmaceutical students.

It would be entirely out of place for me, young as I myself am, to presume to give moral advice, so I will refrain, but I may quote the words of one whose wisdom has been the admiration of all ages. "Now therefore hearken unto me, O ye children; for blessed are they that keep my ways. Receive my (*i.e.*, wisdom's) instruction and not silver; and knowledge rather than choice gold. For wisdom is better than rubies; and all things that may be desired are not to be compared to it."

I conclude with the following lines by O. Wendell Holmes, which show that our future is greatly in our own hands, and if we choose to do the right we can become honest men and true pharmacists:—

> "Think not too meanly of thy low estate;
> Thou hast a choice; to choose is to create."

In moving a vote of thanks, which was cordially awarded, Mr. John Wilson, Vice-President, remarked that he thought the introduction of mathematics as a subject in the Preliminary examination would be a decided advantage to students.

Mr. Gilmour, Chairman of the Executive of the North British Branch, in seconding the vote of thanks, said he had listened with much pleasure to Mr. Coull's interesting and racy address, and had especially enjoyed his many humorous and apparently impromptu asides. He would not attempt to offer any criticism. The address bore evidence of careful thought and contained many suggestions well worthy of consideration. With regard to examinations, he certainly thought it would be a decided advantage to all candidates to have a knowledge of mathematics. In his address in those rooms last year Professor Crum Brown pointed out the increasing importance of mathematics to the student of chemistry, and that alone should be an inducement for all who intended to follow the practice of pharmacy to acquire a knowledge of the subject. Mr. Coull had referred to one instance of a member of the Association having made a useful suggestion which had been adopted in the national Pharmacopœia, but there were also others. He noticed from the syllabus that they were to have a number of practical papers during the coming session, and he hoped they would continue to do good work. He was very much pleased to see so large and encouraging a meeting, and he would like to suggest to the younger men the desirability of coming to the front and filling up the vacancies which must from time to time occur through losing the older and more prominent members. The fact that this was the beginning of their eleventh session was itself significant, and he had great pleasure in wishing them prosperity and success.

The discussion was continued by Messrs. Carsewell, Duncan, Henry, Hill, Lunan, Macpherson and Merson.

The Secretary then read the report of the Prize Committee on Mr. Crowden's prize for the best description, by an apprentice member, of the botanical excursions. Two essays, both of high merit, had been handed in, and the prize was awarded to Mr. Thomas Conley, 36, Howe Street, to whom the President presented a copy of the British Pharmacopœia.

Mr. W. Taylor, Secretary, was elected Vice-President in room of Mr. J. Wilson, resigned; Mr. A. R. Bennet, Assistant Secretary, was elected in room of Mr. Taylor; Mr. G. F. Merson in room of Mr. Bennet; and Mr. Butchart, member of Committee, in room of Mr. Merson.

The Chairman having intimated that the next meeting would be an open one, under the charge of Mr. George Lunan, ex-President, the meeting was closed.

The annual conversazione has been fixed for Friday, December 7, in the Literary Institute, South Clerk Street. The Committee are arranging for an interesting exhibition during the first hour.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

Gum Arabic and its Substitutes.

BY T. A. ELLWOOD, A.I.C., F.C.S.

(*Concluded from page* 342.)

I will now mention several instances in which algin compounds may be used to replace acacia in the arts.

In calico printing their use is no doubt an advantage, owing to the ease with which they are decomposed, forming insoluble salts; but dextrin has been largely introduced of late years for that purpose, this being a cheap substitute for senegal gum, which was formerly used for that purpose.

Gum arabic and cherry tree gum as used by hatters to smooth the nap of hats, may doubtless be advantageously substituted by algin. It may too be used as a size; though in such a case it chiefly replaces gelatine and not gum. I however just mention it, as I have found the size to be better than that from the varieties of glue sold for that purpose generally.

It will also make a good base for confectionery and jujubes, though I doubt its value for ordinary lozenges, more especially medicinal.

In pharmacy its general use would be rather limited. As a pill excipient, a jelly made in the proportion of 30 grains to the ounce of distilled water is very useful, in many instances superior to the general favourite glycerine and tragacanth; whilst the mucilage 12 grains to the ounce is a useful substitute for mucilage acacia in all instances where an adhesive is required, or as a suspender of powders, providing they are compatible with it.

One of the great uses of acacia in pharmacy is as an emulsifying agent, and one of its necessary properties is that with oil it should form a white emulsion. Algin more closely resembles tragacanth than acacia in its emulsifying qualities, that is, it is rather to be called a suspender than an emulsifier, for whereas with acacia, if the emulsion is properly formed, a large quantity of water may be added, without separating the oil, in the case of algin it is very different. It rather depends upon the viscosity of the mixture, than the minute division of the globules of oil; indeed the globules of oil are visible, even with the naked eye, and on standing a few hours they rise to the top in a partially emulsified form, which on shaking becomes again disseminated through the mixture. The emulsion moreover is not white, but resembles one made by the aid of gum tragacanth.

The samples before you will give a clearer idea of the general character of emulsions made by using algin as an excipient. First form a mucilage 12 grams to the ounce of alginate of soda.

1. Cod liver oil	1 part.
Mucilage	1 part.
Distilled water	2 parts.
2. Castor oil	3 parts.
Mucilage	2 parts.
Distilled water	4 parts.

Using mucilage from alginate of ammonia, the same emulsions were made.

These emulsions were made by rubbing down the oil, gradually added to the mucilage in the mortar, and then adding the water a little at a time. At no part of the manipulation did it resemble an emulsion made similarly but using mucilage acacia. You will observe that the result is far from satisfactory, and thus in emulsions algin is a failure. This can perhaps be accounted for by its being slightly acid, or by the presence of the sodium or ammonium. I have thought that perhaps a salt of potassium might be better, but have not been able to try if this is correct.

For mucilaginous purposes, sticking or gumming labels, etc., algin is superior to gum arabic, being much less hygroscopic when dry, and therefore less liable to lose its properties. It is also much more adhesive, and requires a considerable less quantity. Its use for such purposes deserves encouragement.

I desire to express my indebtedness to the Algin Company for the supply of the samples before you, and also for the alginates used in making the experiments and observations here enumerated. There are five samples, which I will briefly explain from knowledge furnished me by the manager of the company.

No. I.—*Alginate of sodium*, the salt generally implied by the term algin, as it was to this substance Stanford first applied the name. This is the one intended to replace gum, in the arts and pharmacy.

No. II.—*Alginate of ammonium*, a salt very much resembling the preceding, and intended to be used in similar instances; it is, however, darker in colour, and its mucilage is, therefore, unsuited for medicinal use.

No. III.—*Insoluble algin sheets*, purposing to replace bladder, which you will observe it closely resembles in its appearance and texture. On soaking it in water it softens, and can then be used by the druggist to tie over his jars, pots, etc. On drying it assumes its original character. This article I think ought to prove a useful invention, as it is unaffected by the atmosphere and changes in weather, and is not permeated by moisture or air.

No. IV.—*Carbolised algin* (*insoluble*), in thin sheets resembling fine gutta-percha tissue or gold-beater's skin. This is recommended for similar purposes to which their use is applied, as in dressing wounds, etc.; it will probably prove another article of commodity for the pharmacist.

No. V.—*Insoluble algin, coloured sheets.* Owing to the ease with which algin takes colour, these sheets have been made for ornamental purposes, and should prove specially useful to manufacturing confectioners, rather than to our profession.

Irish Moss Mucilage.

This has several times been brought before the notice of pharmacists as a substitute for acacia; and while claiming no originality therewith, I may be allowed to join with others in pressing upon the notice of dispensers and chemists the advantages it possesses. Although it cannot be substituted for acacia in every case, there are so many instances in which it could replace gum, that it is well worthy of being kept in mind.

Irish moss or caragheen is derived from the *Chondus crispus*, one of the purple algæ growing abundantly off the west coast of Ireland. When washed ashore by the tides it is collected by the peasants, and exposed to the sun to bleach and dry. The poorer peasants use it for making jellies, and thus with them it forms a staple article of food.

It is well known in all retail pharmacies, although but seldom used. The composition is chiefly mucilaginous and albuminous matter, and salts of sodium; though containing no starch, its decoction is coloured slightly blue by iodine.

Stanford obtained from it 63·7 per cent. of caragheenin, or vegetable gelatine. Emlin Painter (*Pharmaceutical Record*, September 20, 1888) obtained 70 per cent. of dried residue after exhausting with water and evaporating the aqueous solution. This would, however, include the soluble salts as well as albumenoids and mucilage, which was not the case with Stanford's caragheenin, and hence we may assume that the two results about correspond.

The preparation of a mucilage from Irish moss is very quickly and easily accomplished. I can, therefore, strongly advocate its use in many cases where a mucilage is required. It is not necessary now to enumerate facts that have already appeared in the various journals

of pharmacy (*Pharm. Journ.*, May 21, 1887, by P. Boa, and *Pharm. Record*, already referred to).

The mucilage I prepared as follows:—

Iceland moss, well washed, freed from stones and dried	½ ounce.
Distilled water	28 fluid ounces.

Digest the moss in 20 ounces of the water for an hour, and then boil gently for 10 minutes; strain whilst hot through muslin, and then pour the remaining 8 ounces of water in a boiling state upon the strainer. The product is a very thick gelatinous mixture, nearly solid, which, however, breaks up as to be able to be poured from the bottle after vigorously shaking. I have found this strength to be best for making emulsions; it must, however, be quite cold before use. Here are two samples prepared with this mucilage:—

1. Cod liver oil	1 part.
Moss mucilage	1 „
Distilled water	1 „

Thoroughly incorporate the oil with the mucilage by rubbing together in a mortar, and then add the water by gradual additions. This forms a very nice emulsion, practically inseparable, even after several days standing, although not so white as if made with acacia mucilage; it is an admirable emulsion, owing to its permanency, and it is equal in all respects to one made with tragacanth. It can be sweetened and flavoured to suit the various requirements of medical men or patients, or as the pharmacist may himself prefer. Microscopically the globules of oil are larger than they would be if acacia were employed, but are about the same as with a tragacanth emulsion of the same oil.

No. 2. Castor Oil	3 parts	by measure.
Moss Mucilage	2 „	„
Distilled Water	3 „	„

prepared in the same way as the preceding one. This too is inseparable, although the appearance is not at all elegant, the colour not being good and the globules of oil distinctly visible and quite oily in look.

This mucilage I have found will emulsify all the volatile oils and balsams, the latter being of a very fair appearance. In no case did I obtain a result so poor as in castor oil, which is the reason that I show it to-night.

As a suspender of heavy powders, and for general purposes in mixtures, I would recommend a mucilage of half the strength being used, owing to the great viscosity and gelatinous nature of the one exhibited.

In the paper by Peter Boa, before referred to, the writer mentions the fact that guaiacum mixture made with this mucilage does not acquire a greenish tinge so rapidly as when made with acacia. I have endeavoured to ascertain the reason, and have come to the conclusion that it is due to the greater viscosity of the mixture made with moss mucilage than of one made with acacia mucilage. To verify this, I made two mucilages of the respective substances, equal in viscosity; proved by the time for an equal volume to run from a long narrow tube being the same. I then made a guaiacum mixture from each of these mucilages, which were identical in appearances, and upon allowing them to stand together for some time, they each assumed the green shade about the same time.

Moss mucilage like that of acacia is incompatible with subacetate of lead solution, or with ferric chloride; but unlike the latter it is compatible with alcohol.

Irish moss gelatine, a sample of which I now exhibit, is a convenient form of having it for pharmaceutical purposes. It is very easily prepared, with scarcely any trouble, although a slow operation in ordinary retail pharmacies.

I have tried preparing it by the several methods recommended by other writers, by using a hot water funnel and by percolation in the hot state, but these processes are tedious, owing to the amount of trouble and labour entailed. The method I have employed is the following:—

Moss mucilage	1 part.
Boiling distilled water	4 parts.

Mix thoroughly and filter through coarse bibulous paper whilst still hot; the filtration is rather slow but needs no attention. Evaporate to a syrupy consistence in a shallow bath, and pour upon plates in thin layers (ordinary dinner plates I employed, as I found them answer better than glass); dry in a hot air or gas oven. The result is thin sheets of a pliable substance resembling gelatine in its appearance.

This gelatine can be used for the preparation of the mucilage in the proportion of 6 grains to the ounce of boiling distilled water, and allowing to cool. The product is a light, clear, and bright mucilage, perfectly transparent and superior to the mucilage made direct from the alga.

Dextrin or British Gum.—This substitute has long been known, though I am not aware that it has ever been used in pharmacy to any appreciable extent, its chief use being in the arts. It is now largely employed in the calico-printing trade, in which it is found to be almost equal in value to Senegal gum as a vehicle for colours. Its mucilage, too, is used for gumming the back of postage stamps and labels.

It is generally made by roasting wheat starch at a temperature of 150° C., which converts it into dextrin. The purer varieties, which have a yellow colour, are made as follows. Fine wheat starch is roasted in a shallow vessel having a double bottom, and is kept constantly stirred, in order that the heat may be uniformly applied, the heat being continued until the product has assumed a yellow colour and is soluble in cold water. It is then purified by washing with alcohol of specific gravity ·843, first in the cold state and then hot; it is lastly redissolved in water, filtered and evaporated.

This product should be entirely soluble in cold water, reprecipitated by alcohol; it should be soluble in methyl alcohol, and the solution, diluted with an equal volume of water, should not be again precipitated by rectified spirit. It is not precipitated by lead salts, nor should a cold decoction give a blue colour with iodine solution, proving the absence of starch. It is easily converted by the action of dilute acids into glucose. It turns a ray of polarized light considerably to the right, from which fact it has taken its name.

Universal Gum.—This is the name given to an invention of two German chemists, Messrs. A. Rossi and C. Hellfriesch of Offenbach, who have patented the process in England, as well as in Germany.

The article is prepared in three different forms, universal gum, tragantine and soluble starch. The first of these being that most likely to be of service to the pharmacist and confectioner, it is the one I have chiefly worked upon.

It occurs in crystalline pieces, very much resembling acacia in appearance, but is not in such rounded tears, most of the pieces being irregular or tabulated; it is nearly transparent, much more so than picked gum, and though with fine cracks, they are not so numerous as in genuine gum. From just a passing view it would strike one as being a good sample of gum arabic. It possesses a slightly saccharine taste, not, however, disagreeable; it has no odour, is perfectly soluble in cold water, forming a clear, transparent mucilage, neutral to test paper. The mucilage will keep a long time without showing signs of fermentation. In its adhesive power it is not quite so strong as acacia, but far superior to dextrin, and when dry it is not hygroscopic. As a mucilage for labels it is equal if not superior to gum arabic, forming a beautiful smooth surface which does not decompose or crack.

The mucilage is best prepared by dissolving the gum in an equal quantity of cold water, when it results in

a solution having a specific gravity 1·2 nearly. It takes about the same time to dissolve as does acacia. This mucilage will answer admirably for nearly all purposes where acacia is used, namely, as an adhesive, suspender, demulcent, etc., but for emulsions I have found it to be far inferior to acacia, the best result being by using a mucilage made by dissolving 3 parts of the gum in 2 parts of distilled water.

As I have previously mentioned, it has been discovered that gum acacia is formed by a change of composition of the cell contents; hence it may be inferred that in all probability starch is the primary material used in nature's laboratory, and therefore we must look to this source for any imitation of its produce. This has been done in connection with Universal gum, which is made chiefly from potato or other starches, as follows:—

The starch is first heated for some time with an acid (preferably sulphuric); it is then neutralized with a fixed alkali and the mixture heated to a temperature of 200° C. under pressure, or it may be evaporated and heated in the dry state, means being employed to prevent its charring. This temperature is maintained until a product ensues that is perfectly soluble in water. It is then boiled for some time, until all the free starch is converted into gummy matter called gommaline. The resulting mixture is then freed from the salts obtained in the process of neutralization, and from other extraneous matter, the chief being cellulose. It is then decolorized by filtering through animal charcoal, concentrated by evaporation in a current of steam, until it acquires a syrupy consistence, and then further dried by a current of warm air.

It is claimed for this production, that it will substitute gum arabic in nearly all its applications. In my experiments I am led to the conclusion that it is nearly perfect; but here is its imperfection—so far as an emulsifier of oils, it is far inferior to acacia, which you will observe by this specimen; the formula for which is:—

Mucilage universal gum 50 p.c. solution .	1 part
Castor oil	1 part
Distilled water	2 parts.

Rub the oil thoroughly with the mucilage, but in doing so, although it appears incorporated, it does not acquire the beautiful white appearance so characteristic of acacia; add the water gradually after the emulsion is formed.

The emulsion soon separates, and globules of oil are distinctly visible with the naked eye. In a day or two it assumes a curdy appearance. I tried a mucilage a little stronger, but with very similar results, except that the oil remained incorporated a little longer. The carefully powdered gum was next employed, and this was well rubbed with the oil in the mortar, and the water then gradually added. This proved no more satisfactory.

With however the few attempts I have made with this new substance in trying its emulsifying power, even if I have been unsuccessful, I must not at once condemn it as a failure for such a purpose. Perhaps with different methods of manipulation better results may be obtained, and it still prove itself to be an efficient substitute. My opinion is, however, that such is very doubtful, judging from its behaviour with oil.

This gum may be used in the manufacture of medicinal and other lozenges, but it rests with our well-known firms to say with what success. The inventors have however received testimonials from the German lozenge makers, who have given it a trial as to its practical utility in their business as a substitute for gum acacia. The representative in England, Mr. F. Kühn, informs me that "lozenges made with it are as clear as crystal and perfectly soluble."

This substance can be produced on a large scale, and sold at a good profit for less than £20 per ton, whereas gum arabic, finest picked white, is making at the present time nearly twenty times that amount.

It gives no starch reaction, but reduces Fehling's solution, precipitating cuprous oxide. It is incompatible with alcohol in strong solutions, does not give precipitate with lead salts. I have not, from want of time, been able to test its further reactions with ordinary salts, which must of course largely decide its usefulness or otherwise.

Soluble Starch.—This other sample received from the same inventors is not of so wide an application. It is said to differ in its manufacture by the different treatment with acid it undergoes. It is quite white, and very finely powdered, in all appearances resembling starch; but it is soluble in water.

This is intended to supply the place of gum arabic, only in those instances where dextrin or alizarin gum have hitherto done so, such as in finishing purposes for cloth, linen, silk, crape, embroidery and lace manufactures; or as a vehicle for colours. It is not soluble in cold water, but is readily soluble in hot water, forming a clear neutral liquid.

Another *artificial gum* was patented in England by a German firm about a week prior to the last, but I have been unable to obtain samples for investigation. This takes milk as its source, and is made by boiling together 12·5 kilos. of powdered sugar with 750 grams of fresh cow's milk previously boiled and skimmed, with 2·5 kilos of distilled water and 500 grams of a 20 per cent. solution of glycerine; into this mixture whilst boiling are strained 25 kilos of a 36 per cent. borax solution; the whole is then cooled to 50° C., and poured into small moulds of sheet iron, in which it sets into hard lumps, which may be broken up, and used as a substitute for gum. The boiling process lasts about three days. So far as I can gather information this is not a success, but I have been unable to verify the statement by experiment.

A formula for a further artificial gum appeared in the *American Druggist*, May, 1887. This, too, is of German origin, and in the idea of its manufacture is similar to the last one named. Twenty parts of powdered sugar are boiled with seven parts of fresh milk and then mixed with fifty parts of a 36 per cent. solution of silicate of sodium, the mixture is cooled to 122° F., and poured into tin boxes, where granular masses will gradually separate out; in appearance they very closely resemble the tears of gum arabic. This preparation instantly reduces Fehling's solution, so that if mixed with powdered gum it is easily detected. The sodium silicate too would cause the amount of ash to be very high.

At the conclusion of the paper,

The President congratulated Mr. Ellwood on his admirable and useful paper, and also on the interesting specimens he had exhibited. Papers like this required much time and trouble to produce. He was rather surprised that Mr. Ellwood had not offered some explanation of the present high price of acacia. Notwithstanding the disturbances that had taken place in the gum-producing district, the price seemed to him to be out of all proportion, especially when they reflected that senna, which came from the same part, had not varied in price, whilst gum had increased to more than six times the original value. He suggested that perhaps the explanation might lie with the buyers; to use the language of the Stock Exchange, bulls might be at work to maintain the price. The most useful of the natural substitutes certainly appeared the amrad and ghatti gums, but their colour was against them, and he should like to ask Mr. Ellwood whether he had tried any methods of decolorization. Algin also had certain advantages, but its defects had been well shown in the paper. He had obtained some peculiar results on the application of the lead test to various kinds of gum: thus acacia gave a precipitate, whilst East Indian, in some cases,

did not, and he should like to ask if Mr. Ellwood could explain this. Acacia gum was a substance they all had much to do with, and he hoped therefore the members would discuss this paper freely.

Mr. Martindale said Mr. Ellwood's paper was especially interesting now, in consequence of the present high price of good acacia gum. He had recently received a letter from Mr. Reynolds, asking if he considered there was much juggling practised in connection with the smaller kinds of gum. In reference to the substitutes for gum, where the smell was not objectionable, dextrin was useful for mucilage, for labels, etc., and in fact he believed gum had for some time been given up for postage stamps as too sticky. Algin perhaps might answer well for pill coating. In connection with its swelling up in water, he should like to point out the important fact, that in distilled water it swelled to double the volume that it did in common water, and this showed the importance of employing distilled water in pharmaceutical preparations. He was of opinion that there was as yet nothing at all equal to gum acacia for making emulsions. He had noticed that even fresh mucilage was always a little acid, and no doubt it was important that it should be so, for alkalies, as they knew, formed a disturbing element in acacia emulsions. He hoped Mr. Ellwood's paper would lead to the detection of adulteration, either of German extraction or otherwise.

Mr. T. S. Dymond said algin seemed to him to more resemble gelatine than gum, a resemblance which was further borne out by its being a nitrogenous body; it did not seem to him, moreover, to be so adhesive as gum. He should like to ask Mr. Ellwood whether he could give him any information as to the gummy constituent of buchu. Buchu contained a considerable quantity of gummy matter, which was easily seen in an infusion which had stood some time. A large quantity of gum was present too in plums, which might possibly be utilized, and he should be glad to know if the author of the paper had examined it, as it seemed to be an insoluble variety, and different from the soluble kind found in the stem.

Mr. Richards said he should like to point out that dextrin was largely used by manufacturers instead of artificial gums, as it was cheaper and answered their purpose quite as well. Algin had been tried in various trades, but had been abandoned in favour of dextrin.

Mr. Ellwood, in reply, said that the probable reasons for the present price of acacia were the wars that had taken place in the district, hence the gum had not been collected at the proper season. The sources of the gum, too, were most likely dying off, and were not being replaced. They must also remember that the use of gum was greatly extended. The American continent, for example, consumed huge quantities of it. He did not think a "corner" for gums amongst the buyers had been established yet. For the decolorization of amrad mucilage he had found extra filtration through pulv. kaolin the best process. The lead test differed more or less with all gums, and it was best to rely upon the colour of the sample. He knew dextrin was largely used in common confectionery, but it was a failure in medicinal lozenges. Algin might be useful as a pill coating, but he did not think it would supersede those in use at present. He had noticed the increased swelling that took place with distilled water and algin, and the white specks in the sample of emulsion exhibited he found to be lime from the ordinary water used. The deterioration of gum, he believed, to be due to careless collecting, and he feared it would be some time before samples of gum could be obtained as good as formerly. The real fault lay with the pickers rather than the collectors. Algin more resembled tragacanth than either gelatine or gum. He had not examined the gummy matter in buchu, and therefore did not know whether it was medicinal or not. He had once collected about an ounce of plum gum, but had not been able to examine it. It yet remained to be seen whether these artificial gums would replace dextrin in the arts or not. The source of both was starch, and it seemed probable.

Parliamentary and Law Proceedings.

The Sale of Beef and Quinine Wine.

At Cardiff Police Court, on October 17, before Mr. L. Goodrich (the deputy-stipendiary), and Dr. H. J. Paine, Mr. John Thomas Walklate, Chemist, Church Street, was summoned for selling Pearson's Liebig's Beef Wine, insufficiently medicated as a beverage, thereby rendering himself liable for selling wine without a license.

Mr. J. Vincent Suche proved the sale of the wine, and Mr. H. L. Helm, analyst, Somerset House, stated that the wine contained 32 per cent. of proof spirit.

In cross-examination he admitted that he found 8 per cent. of beef, and also one grain of quinine per ounce. It was contended that Pearson's Liebig's Beef Wine could be sold without a license.

The Deputy-Stipendiary upheld this view, and dismissed the summons with costs.—*Cardiff Paper.*

The Sale of Black Beer.

At Manchester, William Henry Delve, wholesale drysalter, 241, Stretford Road, Hulme, appeared before Mr. Headlam in answer to a summons charging him with having sold a bottle of Dantzic black beer, he not being in possession of an excise licence.

On behalf of the Commissioners of Inland Revenue it was stated that a magisterial licence was not required for the sale of black beer, but an excise licence was. The sale of any beer which contained more than 2 per cent. of proof spirit could not be lawfully carried on without an excise licence. The beer which was obtained from the defendant contained 5·8 per cent. of proof spirit. Black beer consisted of a very strong extract of malt. This was the first prosecution with regard to black beer which the Inland Revenue officials had instituted, and they had no desire to press the case. The proceedings were brought in order to give publicity to the question.

The defendant, in defence, said black beer had been sold for generations without licence, and the Inland Revenue, before making this change, should have given notice to the trade. Black beer was used as a medicine and not as a beverage.

A fine of 5*s.* and costs was imposed.

Correspondence.

The Storage of Poisons.

Sir,—The march of events is often pitiless to the repose of nations, and not less so towards classes of men. But the tendency of Englishmen is not usually in the direction of a distressful anticipation of coming evil. In this mood, pharmacists have in the past awaited aggressive legislation and have dealt with it, as best they might, on its merits. Their old acquaintance, the storage of poisons question, re-appears now in more doubtful guise. Is the fly idly thrown across our track, or is it with a serious belief in its killing powers that it is dressed cunningly with assurances of good things, that are little short of a promise of the lasting favour of the gods? Could not some of the last batch of "Preliminary" students supply us with a classical quotation on this "bearing of gifts" and the attitude it should inspire?

However, I concur in the opinion that it will be for the public advantage if those who were actively concerned in 1871 in Parliamentary opposition to the Bill introduced by the Privy Council, now re-state why they took such a course. I will do this with the full admission that the lapse of seventeen years may have changed the circumstances, and consequently the policy that should now be

adopted, and that the new jury should try the case on the evidence, as if it had not been heard before.

Briefly, the Bill of 1871, "The Pharmacy Act (1868) Amendment Bill," proposed to confer on the Privy Council the power to "frame regulations as to the matters aforesaid," *i.e.*, "the keeping, dispensing and selling of poisons." When passed, it would have become an integral part of the Act of 1868, and breaches of its regulations would be subject to the same penalties, varying from the standard penalty of five pounds to removal from the Register at the will of the Privy Council. The House of Lords passed the Bill, only three days elapsing between the second and third readings, but when its provisions were known to and considered by chemists throughout the country, extensive opposition to the Bill was organized, and a majority of the Council of the Pharmaceutical Society supported this opposition.

The origin of the measure has always been stated to have been an engagement given by the then President of the Pharmaceutical Society, Mr. George Webb Sandford,* to the principal medical officer of the Privy Council, to the effect that such regulations should be made. Now, it was clear that if the President entered into such a compact it was *ultra vires*, for neither the Council nor the Society understood that they were committed to such a step. When the proposals of the Bill became known the experience of practical men in all parts of the country led to their condemnation. It was one thing for each to adopt careful precautions for the storage of poisons, but quite another to assent to a proposal that the State should declare scheduled poisons to be dangerous only when in the custody of the one class trained to deal with them. It was manifest that the danger was either inherent to the poison, or attached to it because of the imperfections of its custodians. The Bill ignored the first theory absolutely, for it left half the poisons in the country uncared for, the surgeries of medical men, of veterinary surgeons and the dispensaries of hospitals being untouched. Some critics have asked what right the pharmacist had to go beyond his own case, but the answer was plain—the object of the Bill was known to be the affixing of danger signals to poisons; it was to be a mechanical check superadded to the greatest protection of all, viz., the education of the chemist, made compulsory by the Act of 1868. And yet half the poisons of the country were to go without this protection, the practical experience of a wide circle of chemists at the same time showing that the persons taking dispensing duty were constantly interchangeable between shop and surgery, or hospital and shop, the same person frequently taking duty in both places on the same day. Jacob Bell's axiom that "a weak fence round a dangerous pond was itself a danger" was appropriate here, for it was inevitable that dispensing accidents would be created by the well-meant but most unpracticable attempt to prevent them.

Then came the question of the machinery to carry out the purposes of the Bill; it defined none, and an inquiry would be met by a cheerful twinkle of the eye and the assurance that we should hear no more if the Bill was only passed. This was a heavy draft on one's credulity, and it was clear that if it were true this year, the official class would not be likely long to omit the duty of appointing inspectors. As probably nine out of ten chemists had house and shop together, and few of them failed to store some goods in rooms connected with their residence, the prospect of inspection was not to be ignored as being of no consequence. Given inspection and inspectors, prosecutions would follow as a matter of course, or how would their existence be justified and continued? Every master being responsible for the act of every servant, no one would be safe against technical breaches of such an Act. The very question of what was a legal poison was in the most hazy state, as "the preparations of" opium and other scheduled drugs included lozenge, not to mention paregoric elixir, about the legal status of which the wildest doubt existed. For the official statement of objections to the Bill, the reader must be referred to the memorial to the Right Hon. W. E. Forster, M.P., Vice-President of the Council, adopted by a special meeting of the Council of the Pharmaceutical Society on June 24, 1871. Such reasons as these induced us in 1871 to appeal to our Parliamentary representatives to consider our objections to the Bill, which was ultimately withdrawn by the Government at the end of the session.

By all means let the case be reconsidered now. Let us ask ourselves whether any of the circumstances have changed since 1871, and it will not be amiss to inquire what our experience has been under the vagaries of a few (exceptional) Public Analysts who have tortured the Food and Drugs Act. There is one changed circumstance we shall probably be told, it being more than hinted that in consequence of our action in 1871, the Medical Department of the Privy Council has persistently refused us facilities for legislation, and continues to do so after an interval of seventeen years. I shall be no party to the assertion of such a libel, monstrous if true, and which surely cannot be an accurate indication of cause and effect.

It may be that the spirit of our people has been broken by the strain put upon it by the events of the last few years, and that irrespective of the merits of the case, and in spite of their little disposition towards intrigue, they may be induced despairingly to sell their birthright of fair and equal treatment and allegiance only to laws supported by the judgment of Parliament. Such bargains were undoubtedly made at an early date in the world's history, and the consideration in one of the earliest was very much like that put before us now—"a mess of pottage." But that bargain did not prove a good one.

Leeds. RICHARD REYNOLDS.

Sir,—I cannot help thinking it is an infinite pity that our Council has not something more practical and profitable wherewith to occupy their time than raking up an old sore which was thought to have been healed some sixteen years ago. It seems passing strange to think that the decisions arrived at after many a hard-fought battle, not by a fluke or a subterfuge, but by the deliberate judgment of so large a body of the Members of the House of Commons, that the Government of that day was compelled to withdraw the Bill by which it was sought to enact these compulsory regulations, should again be questioned.

Having personally taken a somewhat active part in opposing that Bill, introduced by a member of the Government, backed by our own Council, it was my privilege continually to meet and to discuss with honourable members the merits or demerits of the proposition, and the almost unanimous dissent from the idea of the need of such regulations upon a body of intelligent educated chemists found its practical expression when on the night on which it was expected the Bill would be brought in so large a number of members remained to oppose it that Mr. Gladstone was compelled to withdraw it (*vide Pharm. Journ.*, July 22, 71), and a leading member, an honourable baronet, subsequently remarked to me that "he had never seen so many members remain to so late an hour in order to oppose a Bill of this character."

These are facts which speak for themselves with no uncertain sound, and should the present Council persist in again endeavouring to put so objectionable and needless an encumbrance upon our necks, it but remains for the younger members of the trade to follow in the footsteps of those who fought and conquered in 1872, for any effort of our present Council to meet with a similar defeat. It is to be hoped that those members still upon the Council who first obtained their seat on that Board through the support of the various defence associations of that day, will manfully stand by their old principles, and by their decided actions render further outside action unnecessary.

154, *Marine Parade, Brighton.* EDWIN B. VIZER.

Beta.—If the agent was commissioned by you without a previous understanding as to his remuneration we think he would be entitled to assess the value of the work done for you. But of course there might be reasons to justify you in disputing the claim.

A Student.—The formation of a precipitate would be prevented by the free acid present in both preparations.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Symons, Abraham, Benger, Alcock, Thompson, Photographer, A Sufferer, C. R. S.

* It will give pleasure to many of your readers if I say that last month I had the gratification of seeing Mr. Sandford in his retirement at the patrimonial house in Norfolk, where he quietly enjoys his pleasant surroundings. His many services to the cause of pharmacy are held in grateful remembrance, and not the less so by those who opposed the Bill of 1871.

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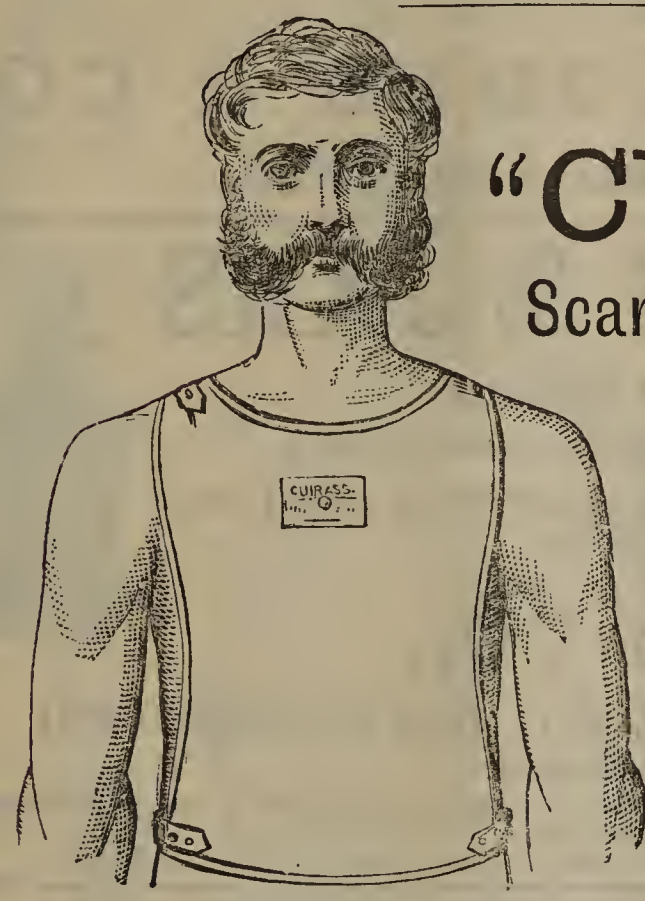

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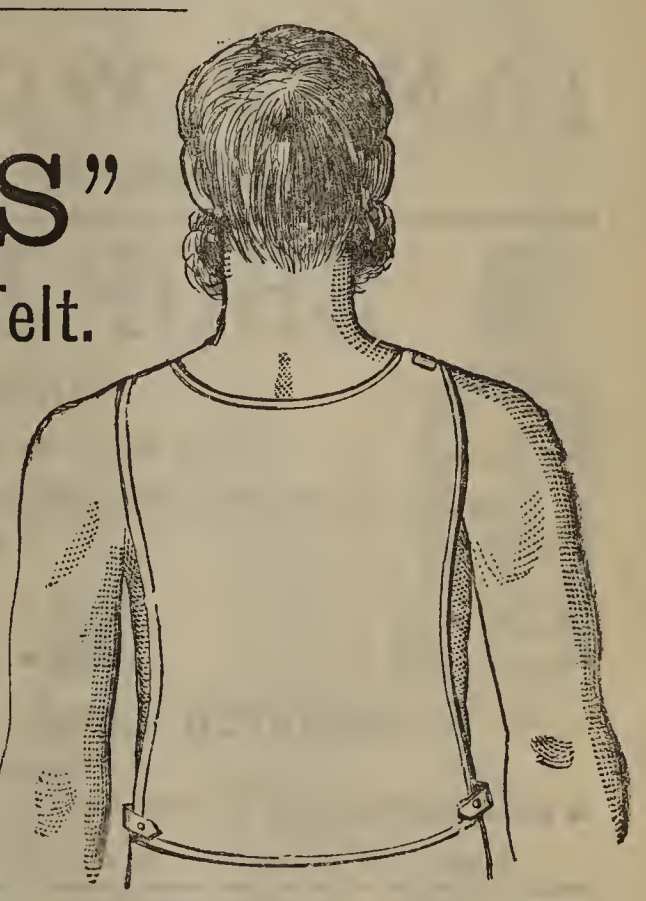

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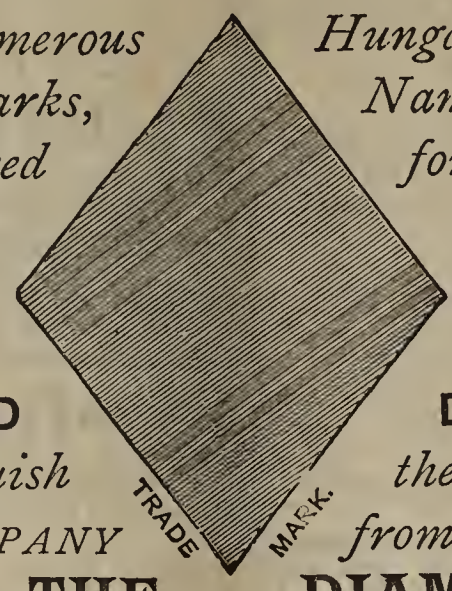

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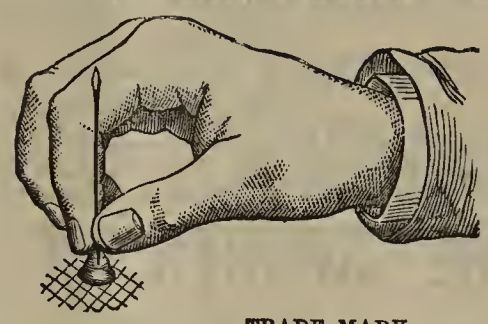

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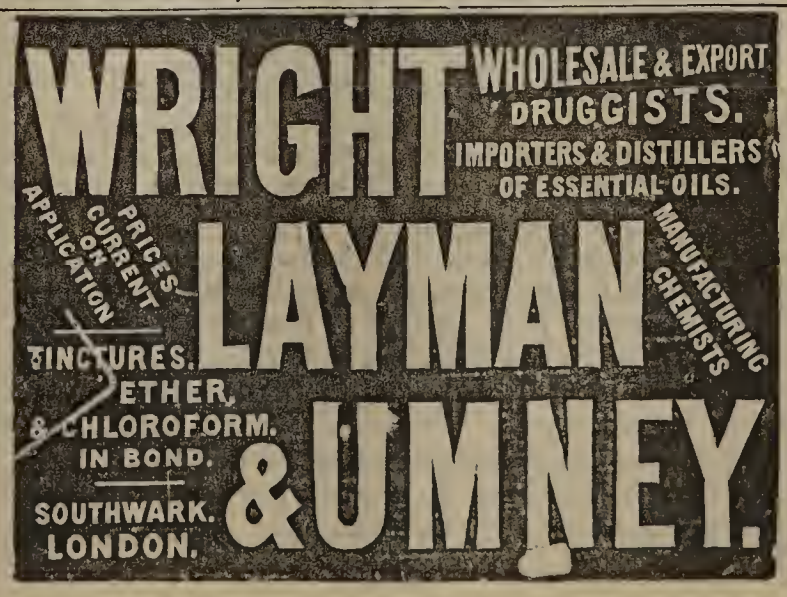

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SOUTHGATE Street, Gloucester.—BRUTON, KNOWLES & Co. are instructed by the Trustees of the will of the late Mr. T. J. Hunt, to sell by auction, at the Bell Hotel, Gloucester, on Wednesday, the 14th day of November, 1888, at 4 for 5 o'clock, the excellent Freehold Business Premises and DWELLING-HOUSE, known as No. 10, Southgate Street, most desirably situated in the centre of the city, comprising a double-fronted shop, with plate glass windows, drug room, dining, drawing, and breakfast rooms, 6 bed rooms, bath room, W.C., kitchen, and domestic offices, capital wine, beer, and coal cellars, with courtyard in the rear. The Premises, which occupy an important position for business purposes, are in perfect order, have a frontage to Southgate Street of 23 feet, and a side entrance.

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5. £1000.—PARTNERSHIP. Wholesale Drysaltery. In a large provincial town a vacancy occurs for an energetic partner, who must be prepared to invest about £1000, for which an adequate return is offered. Particulars will be furnished on receipt of business card or London reference.
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Personal applicants receive Messrs. O. & Co.'s direct attention and advice, where required, free.

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Terms for valuation on application.

Appointments by post or wire have immediate attention.

ORRIDGE & CO.
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(TRADE MARK.)

WINTER SEASON, 1888-9.

Manufactured at our own factory, Balstad, Norway.

The "A 1" Oil was made this season under exceptionally favourable circumstances, and is now in splendid condition. It is entirely free from the solid fatty acids which are commonly found in the ordinary "Non-freezing" and other Oils It is also more brilliant in colour and sweeter in bouquet, and does not deposit during frosty weather. It is always found to be easy of digestion, even by the most fastidious patients.

The price of the "A 1" Oil is **7/- per gallon in Winchester Quarts;** by 12 Winchesters 6/9, or 36 Winchesters 6/6 per gallon, to a/c.

This low price should induce any Chemist who has not hitherto kept the "A 1" Brand to give it a trial; and in order to facilitate this we are prepared to PAY CARRIAGE to any part of the United Kingdom on parcels of not less than 12 Winchester Quarts.

OLEUM GADI MORRHUÆ (finest pale Norwegian), 6/ gal.; 12 Winchesters 5/9, 36 do. 5/6 gal.
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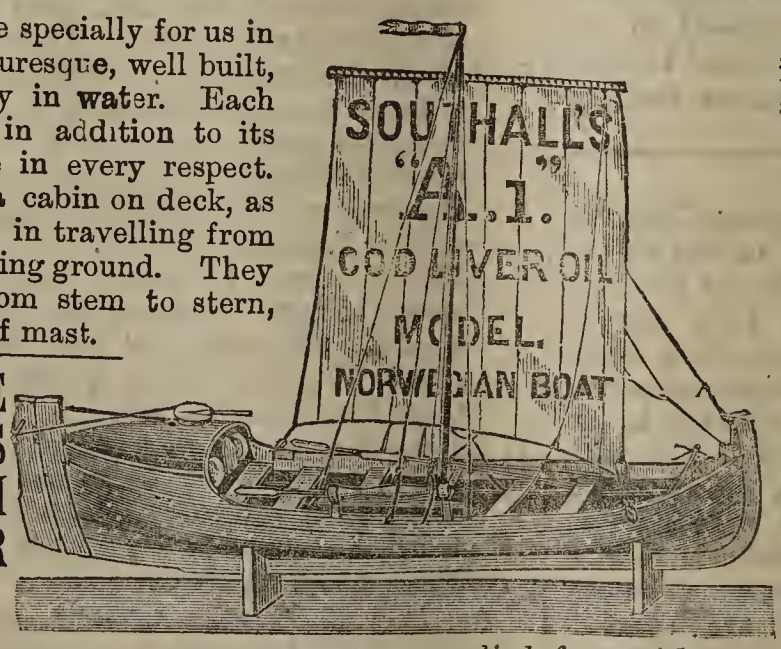
FOR VETERINARY PURPOSES we are able to supply a **GENUINE COD LIVER OIL** at 3/9 per gallon, or **HADDOCK OIL** (Oleum Morrhuæ Æglefinæ) at 3/6 per gallon.

These Models, made specially for us in Norway, are very picturesque, well built, and behave admirably in water. Each Boat possesses oars, in addition to its sail, and is complete in every respect. It is also fitted with a cabin on deck, as used by the fishermen in travelling from their homes to the fishing ground. They measure 28 inches from stem to stern, and 32 inches to top of mast.



These boats are intended for the interior of shops and windows as an attraction and advertisement for the "A 1" Oil; the price fixed is very moderate — namely, 10/- each. As frequent applications have been made to us for the Boats for other purposes, we find it necessary to state that the Boats are only supplied to purchasers of the oil.

TEN BLUE TRADE MARK LABELS SUPPLIED WITH EACH WINCHESTER QUART.

The "En Norsk Fisker" Labels, in Colours, are now sold at 2s per. 100.

Circulars for General Distribution supplied free, with name and address of customer.

New Medical Circulars, without name, together with neatly-packed Samples of the New Oil, will be sent when required.

SOUTHALL BROS. & BARCLAY, Manufacturers,

BALSTAD AND BIRMINGHAM.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 959.] SATURDAY, NOVEMBER 10, 1888. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

17, BLOOMSBURY SQUARE, LONDON.

An EVENING MEETING of the Society will be held at the Society's House, 17, Bloomsbury Square, London, on Wednesday, November 14th, at half-past Seven.

The chair will be taken at Eight *precisely*.

The following Papers will be read :—

"Communication from the Research Laboratory of the Pharmaceutical Society—Chemical Observations on Tartar Emetic. By Professor DUNSTAN and Miss L. E. BOOLE.

1. The volumetric estimation of Tartar Emetic.
2. The action of alcohol on aqueous solutions.
3. The specific rotation of aqueous solutions.
4. An examination of commercial specimens.
5. The preparation of the pure salt for use in medicine."

"Note on two Resins used by the Ancient Egyptians." By E. M. HOLMES.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at 7, and the Curator of the Museum will be in attendance to give any information or explanation with regard to the objects exhibited that may be required.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society, of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of THREE ANNUITANTS, on the Benevolent Fund of this Society will take place on Thursday, the 6th day of December next, at 12 o'clock precisely.

RICHARD BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 3rd, 1888.

For List of Approved Candidates, see Journal, October 20, page ii.

There are at present *forty-nine* annuitants, receiving £1670 per annum, and casual relief is also granted, amounting in 1887 to nearly £500. The total expenditure in 1887 was £2375.

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WINTER SEASON, 1888-9.

Kay's Family Reference Almanack, 1889.

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3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM. JOURN.**" and must be sent only to J. & A. CHURCHILL, 11, New Burlington Street, London, W.

Telegraphic Address, "Churchill, Publishers, London."

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TOMLINSON, R., & SONS	Shop Fittings	23
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PURE CRUSHED LINSEED IS NOW

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PURE GRAIN SPIRIT 56 O.P. ... 18/5

Do. Do. DOUBLE DISTILLED 18/9

Cash with Order. Reductions for larger Quantities than Two Gallons.

SAMPLES FREE.

STEPHEN SMITH & CO., BOW, LONDON, E.

IMPORTANT TO CHEMISTS AND OTHERS

Excise Prosecution.

PEARSON'S Liebig's Beef Wine.

On Wednesday, Oct. 17, 1888, at Cardiff, before Mr. J. L. Goodrich (the deputy-stipendiary), and Dr. J. H. Pain, J.P., Mr. J. T. Walklate, Chemist, Cardiff, was summoned by the Excise authorities for selling without a license "Pearson's Liebig's Beef Wine."

The Excise were represented by Mr. Blaylock, and Mr. G. David appeared for Mr. Walklate.

The case was opened by Mr. Blaylock stating that this case was brought before their Worships at the instance of the Board of Trade. After a few opening remarks, wherein he stated that the article in question, viz., the Beef Wine, was insufficiently medicated, and consequently had rendered the vendor liable for selling without a license. In support of his statement he called Mr. H. L. Helm, analyst, Somerset House, who stated he had analysed the Beef Wine now before their Worships and purchased of Mr. Walklate, and found to contain 32 °/₀ of proof spirit and 1 grain of quinine to the ounce.

Cross-examined by Mr. David—

Did you discover any essence of beef?

Yes.

How much?

8 per cent.

Nothing more?

No.

Have you heard of Sir Charles Cameron?

Yes.

Would you accept him as an authority?

Yes.

(Mr. David, handing up Sir C. Cameron's analysis).

Will you read that? (after reading) Do you admit that to be a correct analysis?

Yes.

Do you agree with that statement?

Yes.

Sir Charles Cameron states here, that one quart of Pearson's Liebig's Beef Wine contains the expressed juice of 5 lbs. of beef; do you agree with that?

Yes.

Mr. David (addressing the bench): I submit there is no case.—The wine is a properly medicated article and consequently free or exempt from duty.

Deputy-Stipendiary: Such was my opinion last week, Mr. David, when the case was before me, and I am of the same opinion still. I consider Pearson's Liebig's Beef Wine to be a medicated wine, consequently exempt from duty—people do not put these articles into wine for table use, but for medicinal purposes, in which Dr. Pain concurred.

Verdict—Summons dismissed with costs.

Sole Manufacturers: LIEBIG'S WINE COMPANY,

66 & 68, HIGH STREET, LIVERPOOL

AND

12, ST. HELEN'S PLACE, LONDON, E.C.

"CARNABYN"

(REGISTERED)

A NOURISHING MEAT AND MALT WINE COMPOUND.

A stimulating tonic nutrient. Dose—½ to 2 ounces twice daily.

In Bottles, 2s. 6d., 5s., and 7s. 6d.

Of all Chemists and Wine Merchants, and the Manufacturers,

HOOPER & COMPY., Chemists, &c.,

55, GROSVENOR ST., and 26, DAVIES ST., W.; also at 7, PALL MALL EAST, LONDON, S.W.

Laboratory—MITCHAM, SURREY.

CONCENTRATED

PEPTONISED COCOA AND MILK

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PEPTONISED MILK (PATENT)

These two preparations are made with pure rich Pre-Digested Country Milk, and, by mere dilution with hot water, afford a delicious restorative beverage, the assimilation of which requires no digestive effort.

SAVORY & MOORE, LONDON.

Tins, 1s. 6d. and 2s. 6d. Obtainable everywhere.

ROBERT GIBSON & SONS,

MANUFACTURERS OF

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OF EVERY DESCRIPTION.

JUJUBES, BOILED SUGARS, COMPRESSED PELLETS, &c., &c.

Shipped through London Houses to all parts of the World. Price Lists sent on application to the Works,

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The most Marvellous Medicine of the Age for Bilious and Nervous Disorders, Indigestion, and Female Complaints.

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MAW'S
EARTHENWARE INHALERS
FOR
Hot Water, Infusions, &c.

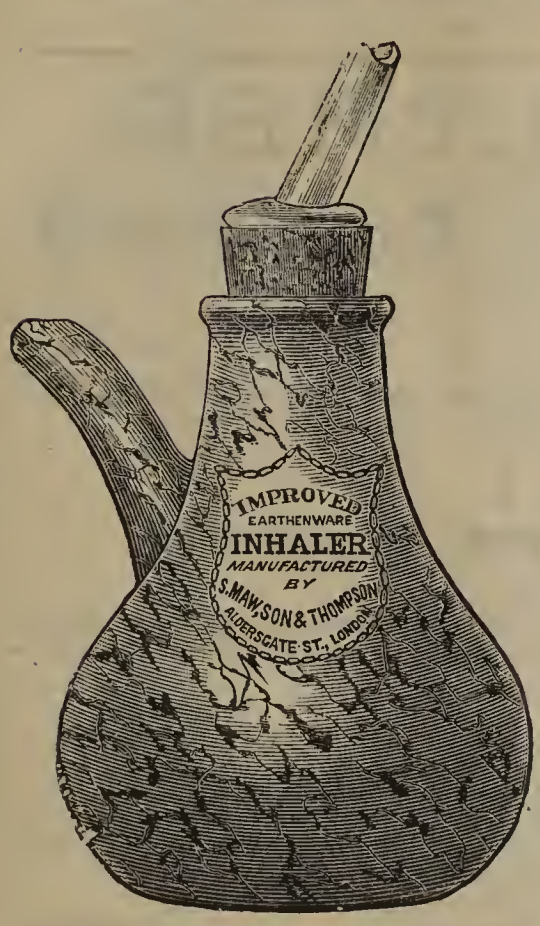

FIG. 8.
MAW'S IMPROVED.

FIG. 6.
MAW'S DOUBLE-VALVED.

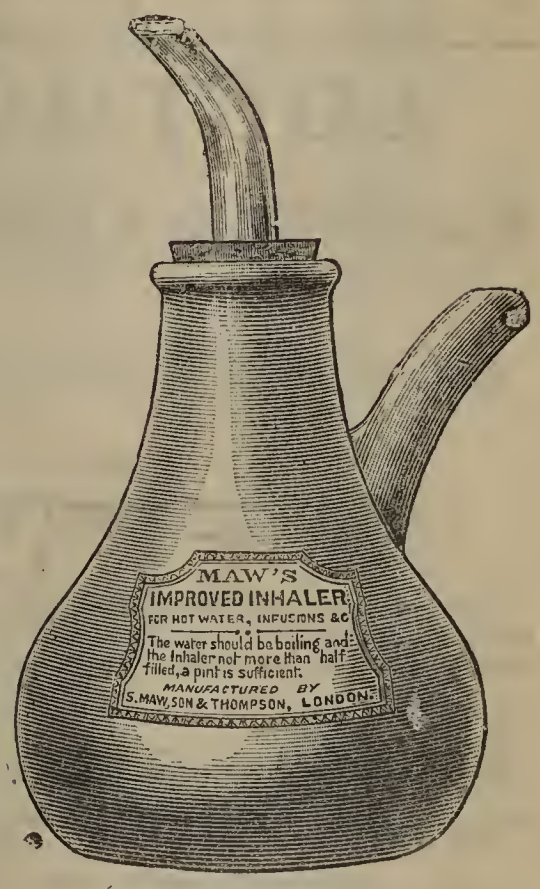

FIG. 8A.
MAW'S IMPROVED.

Fig. 6.—Double-Valved, 60s. per dozen; with Elastic Tubes, 78s.
Fig. 8.—Marbled, 32s. per dozen. Fig 8a.—White, 21s. per dozen.
Fig 8a.—White, half size, 13s. per dozen.

ELASTIC TUBES, with Mouthpieces, to fit Fig. 8 and 8a, 7 inches long, 8s. per dozen; 9 inches long, 12s. per dozen.

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Since the introduction of Pepsine by BOUDAULT and Dr. L. CORVISART, BOUDAULT'S Preparations have been considered the most reliable.

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The Paris Hospitals have used no other.

PARIS, 1867. *HAVRE*, 1868. *LYONS*, 1872. *VIENNE*, 1873. *PHILADELPHIA*, 1877. *PARIS*, 1878.

Medaille Unique.

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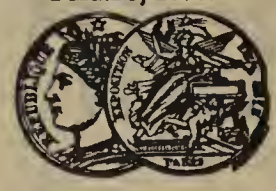

The Jury of the International Exhibition, Paris, 1867, awarded to BOUDAULT'S Preparations the *only* Medal given for Pepsine. Since that time it has taken the Medal at each of the International Exhibitions—Havre, Lyons, Vienna, Philadelphia, and Paris, 1878.

BOUDAULT'S PEPSINE—dose, 5 to 10 grains—in bottles, one ounce, 5/-; in bottles, half-an-ounce, 3/-
BOUDAULT'S PEPSINE WINE—dose, a tablespoonful—in bottles, 4/- and 8/-
BOUDAULT'S PEPSINE PILLS AND LOZENGES—dose, 2 to 4—in bottles, 3/3.

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1 part to 5 Sp. Vini Rect. 56 O.P. makes Sp. Æth. Nit. 850.

This concentrated preparation is carefully drawn in our own laboratory, is highly recommended, and is daily finding increased favour with the trade for making Sp. Nitre, as required for use, and thus avoiding the risk of a development of free acid, which is more or less prevalent in Sp. Nitre that has been drawn some time.

Price in Winchester Quarts, 3*s.* per lb., net.

SYR. FERRI PHOSPH. CO.

This preparation is guaranteed to contain the full proportion of Phosphates as originally prescribed by Parrish, and will keep bright and without deposit.

Price in Winchester Quarts, 6*d.* per lb. to account. Special quotations for quantities of 1 cwt. and upwards.

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Being very strong & nutritious THIS Cocoa is cheaper & more satisfying than tea.

"Admirable," "flavour perfect," "and **so pure.**" } BRITISH MEDICAL JOURNAL.

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SAMPLE TINS GRATIS { through your grocer or chemist.

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FEEDING BOTTLES.

Alexandra Feeding Bottle,
Screw Metal or Earthenware Cap.
11*s.* per doz.

Alexandra Feeding Bottle,
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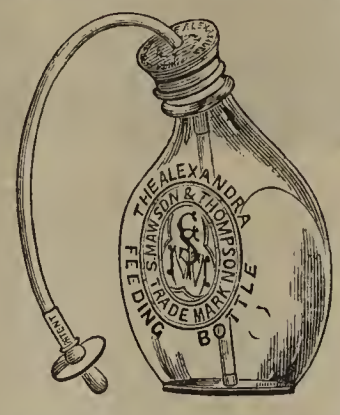
20*s.* per doz.



Alexandra Feeding Bottle,
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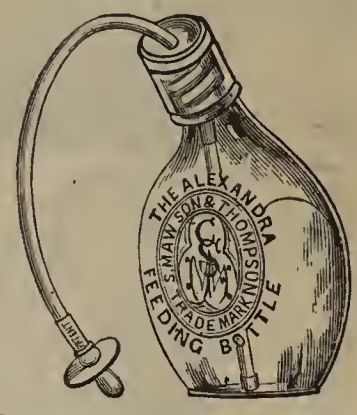
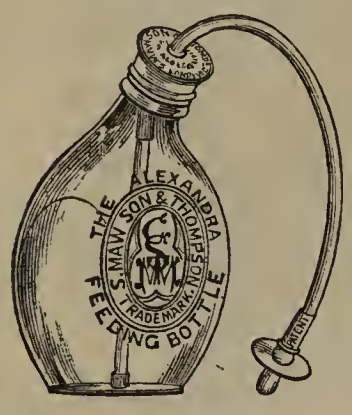
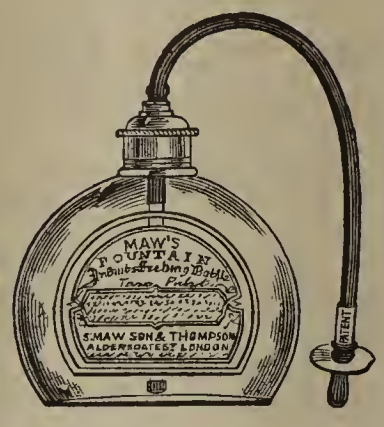
11*s.* per doz.



Alexandra Feeding Bottle,
Screw Glass or Earthenware Stopper. 11*s.* per doz.



Alexandra Feeding Bottle,
Earthenware Cap.
8*s.* per doz.



Fountain Feeding Bottle,
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Fountain Feeding Bottle,
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12*s.* 6*d.* per doz.

Alexandra Feeding Bottle,
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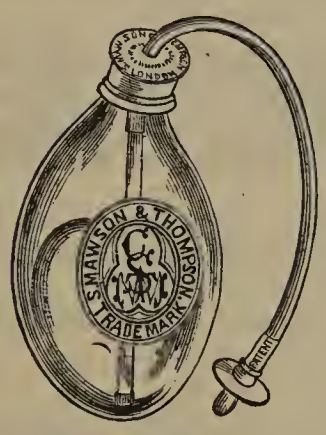
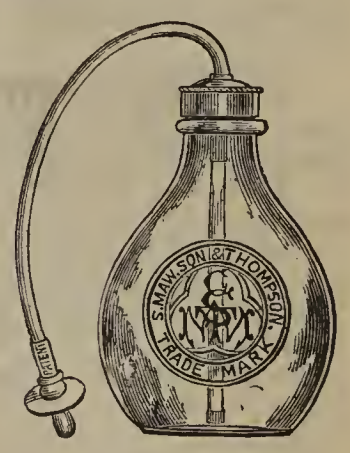
3*s.* and 3*s.* 8*d.* per doz.



Oval Feeding Bottle,
Earthenware Cap.
8*s.* per doz.

Export Feeding Bottle,
Earthenware Cap.
7*s.* 3*d.* per doz.

Export Feeding Bottle,
Screw Glass Stopper.
7*s.* 6*d.* per doz.



Export Feeding Bottle,
Screw Metal or Earthenware Cap.
9*s.* per doz.

Export Feeding Bottle,
Metal Cap.
4*s.* 6*d.* per doz.

Export Feeding Bottle,
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DR. J. COLLIS BROWNE'S CHLORODYNE

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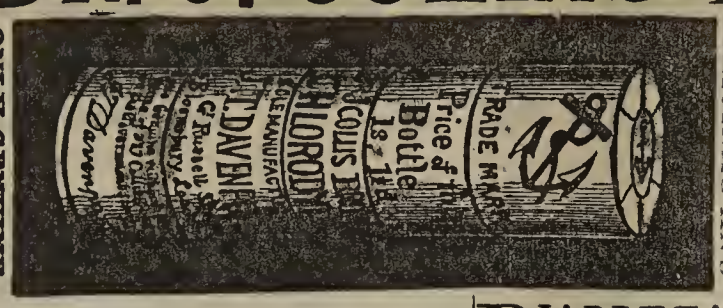

IS THE GREAT SPECIFIC FOR CHOLERA, DIARRHŒA, DYSENTERY.

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DR. J. COLLIS BROWNE'S CHLORODYNE.—Dr. J. C. BROWNE (late Army Medical Staff) DISCOVERED a REMEDY to denote which he coined the word CHLORODYNE. Dr. Browne is the SOLE INVENTOR, and, as the composition of Chlorodyne cannot possibly be discovered by Analysis (organic substances defying elimination), and since the formula has never been published, it is evident that any statement to the effect that a compound is identical with Dr. Browne's Chlorodyne *must be false*.

This Caution is necessary, as many persons deceive purchasers by false representations.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Vice Chancellor Sir W. PAGE WOOD stated publicly in Court that Dr. J. COLLIS BROWNE was UNDOUBTEDLY the INVENTOR of CHLORODYNE, that the whole story of the defendant Freeman was deliberately untrue, and he regretted to say it had been sworn to.—See *The Times*, July 13th, 1864.

GENERAL BOARD of HEALTH, London, REPORT that it ACTS as a CHARM, one dose generally sufficient.

Dr. GIBBON, Army Medical Staff, Calcutta, states: "2 DOSES COMPLETELY CURED ME of DIARRHŒA."

From SYMES & Co., Pharmaceutical Chemists, Simla. *Jan.* 5, 1880.

To J. T. DAVENPORT, London.

DEAR SIR,—We congratulate you upon the widespread reputation this justly-esteemed medicine has earned for itself all over the East. As a remedy of general utility, we much question whether a better is imported, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances *ad infinitum* of the extraordinary efficacy of DR. COLLIS BROWNE'S CHLORODYNE in Diarrhœa and Dysentery, Spasms, Cramps, Neuralgia the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than Collis Browne's, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than Collis Browne's is a deliberate breach of faith on the part of the chemist to prescriber and patient alike.—We are, Sir, faithfully yours, SYMES & CO., *Members of the Pharm. Society of Great Britain, His Excellency the Viceroy's Chemists.*

DR. J. COLLIS BROWNE'S CHLORODYNE is the TRUE PALLIATIVE in NEURALGIA, GOUT, CANCER, TOOTHACHE, RHEUMATISM.

DR. J. COLLIS BROWNE'S CHLORODYNE is a liquid medicine which assuages PAIN of EVERY KIND, affords a calm, refreshing sleep WITHOUT HEADACHE, and INVIGORATES the nervous system when exhausted.

DR. J. COLLIS BROWNE'S CHLORODYNE rapidly cuts short all attacks of EPILEPSY, SPASMS, COLIC, PALPITATION, HYSTERIA.

IMPORTANT CAUTION.—The IMMENSE SALE of this REMEDY has given rise to many UNSCRUPULOUS IMITATIONS. Be careful to observe Trade Mark. Of all Chemists. 1s. 1½d., 2s. 9d., and 4s. 6d.

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THE ORIGINAL AND ONLY GENUINE.

IMPORTANT DECISIONS.

Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

FURTHER IMPORTANT NOTICE.

The subjoined list of eminent Firms concur with Vice-Chancellor Sir W. Page Wood's statement in Court that Dr. Collis Browne was undoubtedly the Inventor of Chlorodyne; and that when Chlorodyne, or the Original Chlorodyne, is ordered, they invariably supply Dr. J. Collis Browne's :—

Apothecaries' Hall	London.	Frazer & Green	Glasgow.	Morson, T., & Son	London.
Allen, Hanbury & Co.	,,	Gale & Co.	London.	Newbery & Sons	,,
Baiss Brothers	,,	Giles & Son	Clifton.	Oldham, G., & Co.	Dublin.
Banks & Richards	Birmingham.	Goulding, Messrs.	Cork.	Parsons & Richardson	Leicester.
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Cox & Gould	,,	Hearon, M'Culloch & Co.	London.	Sanger, J., & Sons	London.
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After these public statements in a Court of Equity, and subsequent confirmation by the trade at large, no Chemist can conscientiously use or sell any other compound for Chlorodyne, without committing a breach of faith, unjust to patient and physician. The *value* of the remedy *alone* creates the great demand.

Sold in Bottles—1s. 1½d., 2s. 9d., 4s. 6d., and 11s. Usual Discount to the Profession.

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Extract from *The British Medical Journal*:—"As an antipyretic I have found this drug to act admirably in from four to twelve-grain doses, having greater and more prolonged effect upon the temperature than antipyrin, and producing no rigors, vomiting or nausea, but rather a sense of well-being, the patient frequently becoming cheerful and demanding food. I hear that it has been used with marked success in the treatment of neuralgia."—LEYLAND ROE, L.R.C.P., M.R.C.S., &c.

Dr. H. MACNAUGHTON JONES writes:—"In every case in which I have used 'Phenacetine' it has lowered temperature without producing any collateral unpleasant effects. I can specially recommend it in the evening pyrexial rise of phthisical cases. The reports of those medical friends to whom I have spoken of it has been also most favourable."

CASE OF NEURALGIA OF THE HEART.

"ALEXANDRA HOTEL, HYDE PARK CORNER, 22nd June, 1888.

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PUMILINE

The only Pure Essence and Extract of Snow-grown Pumilio Pines.

FOR GOUT, RHEUMATISM, BRONCHITIS, SORE THROATS, AND CHEST AFFECTIONS.

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Sir MORELL MACKENZIE wrote, December 9, 1887.

"I have much pleasure in stating that I have made use of Oleum Pumilionis during the last twenty-five years, and that I consider it a most valuable preparation. It acts as an admirable tonic to the mucous membrane of the air passages in cases of chronic bronchitis and laryngeal catarrh. I am glad, therefore, to hear that the remedy is about to be used on a large scale, and I have no doubt the results will be highly satisfactory." (Signed) MORELL MACKENZIE, M.D.

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PYRODINE.

The new and most effective Antipyretic.

PYRODINE produces neither nausea nor vomiting, and acts more *quickly and powerfully* than Antipyrine, Antifebrine or Phenacetine.

See British Medical Journal, October 20th, 1888, page 881.

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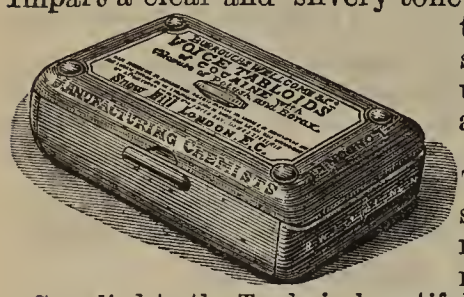

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This drug is highly commended by the British Medical Association's Committee on Therapeutics. Hazeline, being prepared from the fresh green twigs, contains all the valuable volatile principles of the plant Witch Hazel, and is much more uniform and reliable in its action than are the tinctures, fluid extracts, etc., prepared from the dried bark.

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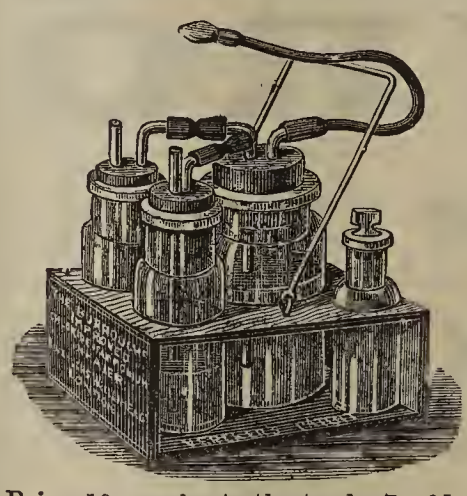

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Report from K. FRANKS, Esq., M.D., Dublin University: "It is the best Inhaler I have ever used, and I think I have tried all the different Chloride of Ammonium Inhalers hitherto devised." "In chronic catarrh of the post nasal region, so frequently associated with deafness, due either to chronic otitis media, or to obstruction of the Eustachian tubes, I have found the regular use of the inhaler for weeks or even months give the most satisfactory results."

"The vapour of the Chloride of Ammonium removes unhealthy and offensive secretions, and restores the long diseased or weakened nasal and respiratory mucous membrane to a healthy state, so that in the case of catarrh, where thickening, induration and irritation exist, a most decided improvement is thereby brought about in a short time." In "throat-cough," pharyngeal irritation, and relaxation and weakness of the throat, it acts as a most effective local alterative and tonic to the mucous membrane.

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ABOVE PRICES SUBJECT TO USUAL DISCOUNT.

THE ASAFŒTIDA PLANTS.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society of Great Britain.

(*Concluded from page* 44.)

V. FERULA RUBRICAULIS, Boiss., 'Diagnoses,' 2nd ser., p. 92 (vol. ii., 1856).

Exsicc.:—'Kotschy,' No. 666, 'Aucher-Eloy,' No. 4614.

Syn. :—*F. erubescens*, Boiss., ex parte, *Ann. Sc. Nat.*, 1844, p. 316.

This species is mentioned as a source of galbanum in 'Pharmacographia' (2nd ed., p. 321) and Bentley and Trimen's 'Med. Plants' (No. 16).

My reason for giving it under the asafœtida plants is that the fruit of the herbarium specimen above quoted has a distinctly alliaceous taste, which galbanum does not possess, and that Boissier ('Fl. Or.,' p. 995) places this species in his section *Scorodosma*, together with *F. Asafœtida* and *F. alliacea*. These facts appear to have been overlooked, since Boissier's 'Fl. Or.' was published in 1872.

The error probably arose from the fact that Boissier described in 1844 (*Ann. Sc. Nat.*, p. 316), under the name of *F. erubescens*, a mixture of two species which he subsequently separated (in Boiss. 'Diagn.,' 1856, *l.c.*) into *Ferula rubricaulis* and *F. gummosa*, and in 1872 placed the latter (Boiss., 'Fl. Or.,' p. 989) under *F. galbaniflua*, Boiss. et Buhse, as a variety *β-Aucheri*,* but removed *F. rubricaulis* to the *Scorodosma* section of asafœtida plants, in which he includes *F. Asafœtida*, *F. alliacea* and *F. rubricaulis*. The leaves of *F. rubricaulis* are not known, but the placing of the plant in the asafœtida section by Boissier should have led at least to a suspicion of the true facts of the case, especially as the vittæ are large and solitary in *F. galbaniflua* and its variety *β-Aucheri* and small and indistinct in *F. rubricaulis*.

The original description given by Boissier of *F. rubricaulis* in the 'Diagnosis,' 2nd ser., ii., p. 92, is as follows :—

"(*Ferula*) caule elato tereti medulla farcto superné ramoso ramisque rubris, foliis. . . . . umbellis fructiferis multiradiatis sub centro umbellæ incrassato, pedunculis ea longioribus umbellas florum masculorum minutas gerentibus auctis proliferis, radiis crassis rubellis, involucris involucellisque nullis, umbellulæ pedunculo apice incrassato, pedicellis tenuibus fructu brevioribus, mericarpiis stramineis planis oblongis vel ovato oblongis, basi apiceque subretusis, epicarpio inter juga filiformia indistincte sæpé in strias longitudinales prominulo, jugis exterioribus in marginem valleculis æquilatum dilatatis; stylis deflexis, stylopodio depresso multo-longioribus, vittis tenuibus angulosis indistinctis, commissura sulculosa evittata. *Ferula erubescens*, Boiss. 'An. Sc. Nat.,' 1844, p. 316, *ex parte*."

Hab :—'In Persiæ borealis monte Dalm-kou Auch., 4614, in faucibus alpis Kuhdaena Persiæ Australi, Kotschy exs., 666.'

With respect to the difference between *F. rubricaulis* and *F. gummosa* (*F. galbaniflua*, *β-Aucheri*), Boissier adds ('Diagn.,' *l.c.*) :—

"Quamvis imperfectissime nota differt a præcedenti (*F. gummosa*, Boiss.) umbellis multiradiatis, mericarpiis paulo minoribus (6 lin. longis, 4 latis), obtusioribusque, jugis intermediis vix prominulis vittis non magnis turgidis in valleculâ solitariis eamque implentibus sed angustis irregularibus in valleculâ and 2–3 nis Hanc speciem in descriptam reliquissem donec ejus folia nota fuissent sed ejus specimina sub nomine erroneo a me dato in coll. Kotschyana publici juris facta exstabant."

In the specimen of *F. rubricaulis* in the Kew Herbarium there are about twenty rays to the umbel, each about two inches long, and the fruit seems to have about three principal ribs with three or four secondary but more slender ones between each of them. The wing of the fruit is about half the width of the seed. In some cremocarps, however, the secondary ribs appear equally prominent with the primary ones. In the British Museum at South Kensington Kotschy's specimen is labelled—

"Planta 5-6 ped.; 16 Julii, 1842. Semine incolis condimentum præbent."

It appears to have a thicker stem than Aucher's specimen, No. 4614, but both agree in the purplish colour of the fruit-stalk, alliaceous taste of fruit and other particulars, and the larger size of the peduncle in the former is probably due to its being a portion of the main axis, and the other of the lateral axis. Boissier adds in 'Fl. Or.,' p. 995, the following additional details, viz. :—

"That the umbels are verticillate above (*i.e.*, that there are spirally arranged, or whorled peduncles below the umbels); (these probably bear functionally male flowers, as in other Ferulas); that the rays of the umbel are twenty to thirty in number; that the pedicels of the fruit are only one-fourth the length of the fruit itself, and that the margin of the fruit is only half the width of the seed. The plant, as gathered by Kotschy, grows 5 or 6 feet high; only fertile umbels were collected, and the central umbels are subsessile, the small ones have longer stalks; the rays of the umbel are about 2 inches long, and the mericarps 6 lines long and 3 broad."

It should be here remarked that the alliaceous taste of the fruit is accompanied by a peculiar bitter flavour resembling that of sagapenum, and it is, I think, more likely to prove a source of that gum resin than of commercial asafœtida. Until, however, further information is procurable it must be placed among the plants capable of yielding asafœtida.

GROUP II.

VI. FERULA ALLIACEA, Boiss., 'Fl. Or.,' p. 995.

This species was discovered by Dr. F. A. Buhse near Dschendak (Junduk?) and Jesd (Yezd) in North-West Persia and on the Ssiokuh, in April and May, 1849. At that date, however, only the radical leaves and some fruits hanging on the withered stems of the previous year could be seen. These were described in the *Bull. de la Soc. Imp. des Nat. de Moscou*, 1850, tome xxiii., No. iv., p. 552, 553.

In 1858 Professor Bunge refound the plant with flower and fruit, and it was then enumerated and identified by Boissier and Buhse as *Ferula Asafœtida*, L.,* under the supposition that it was the same as Kæmpfer's plant.

The plant was subsequently made a new species by Boissier with the following description (Boiss., 'Fl. Or.,' p. 995, 1872) :—

* Galbanum is the product, so far as is known, of *Ferula galbaniflua*, Boiss. and Buhse, of *F. galbaniflua*, *β-Aucheri*, Boiss., and probably also of *F. Tschair*, Borszczow, but not of *F. rubricaulis*, nor of *Ferulago galbanifera*, which latter is sometimes planted in botanical gardens as a source of the drug.

* *Nouv. Mem. de la Soc. Imp. des Nat. de Moscou*, (2), xii., p. 100, 1860.

"*F. alliacea*: caule crasso elato striato rubello folioso superne verticillatim ramoso, foliis dense tomentellis griseis tripinnatisectis segmentis ovato-oblongis vel lineari-cuneatis indivisis vel 3–5 lobis crenulato-sinuatis vel obtuse dentatis decurrentibus, foliorum caulinorum petiolo brevi vaginæformi oblongo limbo valde diminuto, umbellæ radiis 15–20 brevibus fructiferis pendunculisque crassis spongiosis, pedicellis incrassatis brevissimis, mericarpiis ovato-oblongis margine semine quintuplo angustiore cinctis, jugis tenuissimis prominulis, vallecularum et commissuræ vittis obsoletis indistinctis.

Hab:—In Persia orientali circa Djendack et Yezd (Buhse!) in prov. Khorassan prope Schahrud, Nischapur, Meshed, et circa Dehrachtindjan et Kerman (Buhse) alt. 3000′ ad to 7000′ feet Vulgo in prov. Khorassan '*Anguseh*'* et prope Kerman "*Yendebuy*" dicta.

Pl. 2–4 pedalis, folia pedalia ea *F. Asafœtidæ* referentia, sed costa primariæ et secundariæ minus crassæ flaccidæ et segmenta minora lobato-dentata, nec integra, radii sesqui-pollicares, mericarpia illis *F. Asafœtidæ* dimidio minora et angustius marginata 3-3½ lineas longa, vittæ obscurissimæ. Sicut plures species affines *Gummi asafœtidam* fundere videtur."

Boissier's description is, however, too brief to fully identify the plant, and may therefore be supplemented by the description given by Dr. Buhse himself. The latter being in the German language, a translation of the points omitted in Boissier's description is here appended:—

"The leaves are, when young, whitish grey in colour from the presence of a dense, white, short pubescence. They are, when expanded, rhomboidal in outline, broader than long, about 17 inches broad by 13½ long, dark green, with a peculiar dull greasy aspect, due to the short pubescence, which is more marked on the upper side and on the margin of the leaf. The leaves are bipinnate, the four or five pinnæ of the first order being placed at different distances from each other, the second pair being twice more distant from the lowest than from the third pair, and the same is the case with those of the second order. The ultimate segments are pinnately divided with 3–5 laminæ about 1½ inches long and ½ inch broad, and are unequally rhomboidal in outline, the margin of the segments being entire below, but obtusely toothed or cut above, or elongate obovate and irregularly notched at the broader end, the narrowed base of the segment being decurrent. The rachis between the segments is sometimes naked and sometimes broadly winged, the segments being much crowded in the upper part of the leaf, so as to give it almost a lyrate outline. The nerve does not occupy the centre of the segments but is near to the anterior margin. It is more prominent on the under than on the upper side. The leaf stalk is furrowed and angular with scattered short pubescence, which disappears entirely at the base, where it is about ½ inch thick."

This species is stated by Dr. Dymock to be the source of the hing or asafœtida used in India. The gum resin is of a darker colour than ordinary asafœtida and is always mixed with slices of the root. It is rather dearer than ordinary asafœtida, which is known in India as hingra (Dymock, 'Mat. Med., W. India,' 2nd ed., pp. 382–385). It differs from ordinary asafœtida in the alcoholic tincture not being precipitated with acetate of lead and in the sulphuric acid solution not being fluorescent. Seeds of this plant, sent by Dr. Dymock to Mr. D. Hanbury, were distributed to the Botanic Gardens at Kew, Edinburgh, Oxford, Paris, St. Petersburg, Berne, Strassburg, Florence, Pisa, Naples, Palermo, Athens, and to numerous private botanists, but I have not been able to ascertain whether any of these seeds germinated.

† Dymock, 'Mat. Med. W. Ind.,' 2nd ed. p. 382, states that the Hing is known as Darakht-i-Anghuzeh-i-khalis, and that it grows in very stony ground in Khorassan.

VII. Ferula teterrima, Karelin and Kirilow, 'Enum. Pl. Soungariæ,' No. 377.*

This plant was collected in Soungaria in 1841. It is remarkable for its intensely alliaceous odour. Although we have at present no evidence that it is employed as a source of any of the asafœtida of commerce, yet it is hardly likely that it would be overlooked as a source of that drug, if it yields sufficient milky juice to pay for the trouble of collecting it. As an alliaceous umbellifer it deserves a brief notice here.

The original description given by Karelin and Kirilow is as follows:—

"*F.* (*Ferularia*).—Caule elato, tereti, subtilissime puberulo; foliis puberulis quadriternatimsectis, segmentis cuneatis incisis; laciniis oblongis acutiusculis integris bitrilobisve, inflorescentia paniculata; ramis ex umbellis plurimis umbellatim dispositis constantibus, quarum centrali fructifera; reliquæ steriles.

"Hab. Siberica altaica: in collibus lapidosis Soongariæ pr. fontem Sassyk-pastau inter fluvios Ajagus et Lepsa (Karel. et Kiril.).

"Initio Junii specimina pauca fructifera invenimus. Caulis circiter 6 pedes altus, vaginis aphyllis instructus. Folia radicalia fere sesquipedalia, in planta fructifera plerumque emarcida. Involucra et involucella in speciminibus fructiferis delapsa. Pedunculi umbellæ fertilis, vix pollicem longi; sæpius breviores; umbellularum sterilium 2–3 pollicares. Radii basi incrassati; umbellæ centralis 15–23, sesquipollicares; lateralium 11 aut pauciores vix pollicem longi. Umbellulæ 10–12 floræ. Pedicelli 2–3 lineales. Calycis margo breviter 5-dentatus. Petala ignota. Fructus elliptico-oblongi, 5 lineas longi, 2½ lin. lati a dorso compressi, planiusculi. Mericarpia 5-juga, jugis 3 dorsalibus filiformibus; lateralibus marginantibus alatis. Vittæ vallecularum lateralium binæ; altera incompleta; vallecularum dorsalium *solitariæ*, crassæ; *commissurales* 7–8, latitudine et longitudine inæquales, hinc inde inter se confluentes. Carpophorum bipartitum, liberum. Stylopodium depressum. Styli deflexi. Fructus odorem ingratissimum asafœtidam œmulantem, spargunt.

"Cum *F. Asafœtida* commutari non potest ob folia istius secundem descriptionem, multo minus dissecta. Planta in melioribus speciminibus ulterius examinanda, forte sui generis. Karel. et. Kiril., *l.c.*"

This species, so far as can be gathered from the description, seems to approach *F. Narthex* and *F. fœtidissima* in the character of the vittæ, but differs from all the above in the more divided segments of the leaves.

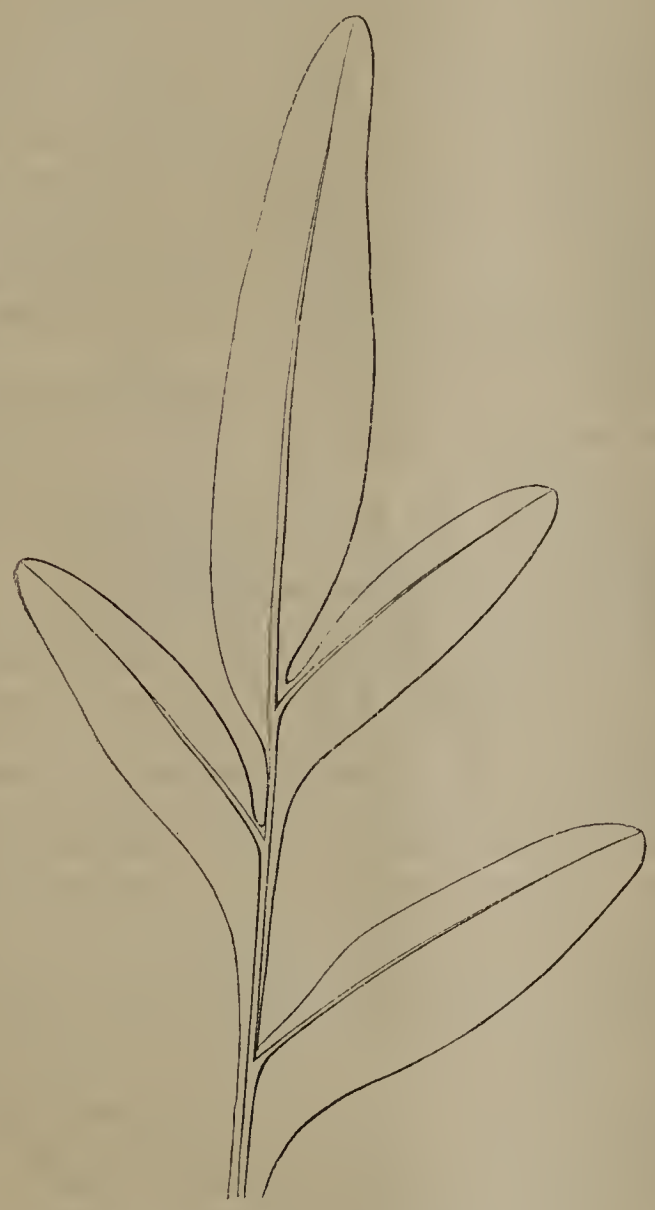
VIII. Ferula Persica, Willd., 'Sp. Pl., 2,' p. 1413.

Syn. *Asafœtida*, Hope in 'Phil. Trans.', lxxv. (1786), p. 36, tab. 3, 4; *Ferula Asafœtida*, *Bot. Mag.*, 2096; Andrews, *Bot. Rep.*, vol. lx., p. 550. *F. puberula*, Boiss. et Buhse. *Nouv. Mém. de la Soc. Imp. des Nat. de Moscou*, 1860, p. 98.

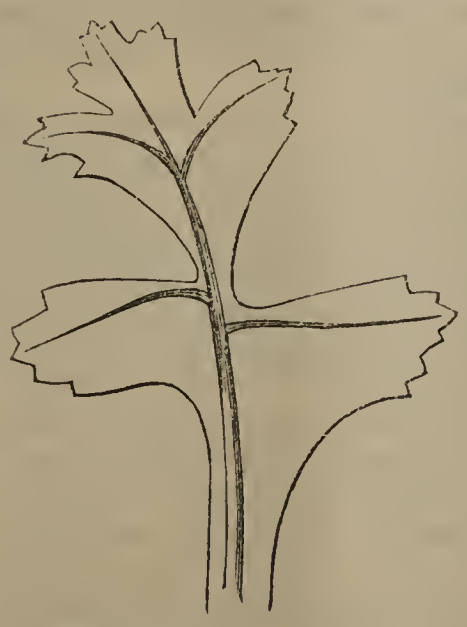
This species possesses some degree of interest from having been regarded during the last century as the source of commercial asafœtida. Seeds of the plant were sent from Ghilan, in N.W. Persia, to Dr. P. S. Pallas, who succeeded in raising young

* *Bull. de la Soc. Imp. des Nat. de Moscou*, 1842, p. 363-365.

I. *Ferula Narthe* .



II. *Ferula fœtida*, Regel.



VI. *Ferula alliacea*, Boiss.

IV. *Ferula fœtidissima*, Regel.

VIII. *Ferula persica*, Willd.

a 2 *b* *a* 6 *b*

a 4 *b* *a* 1 *b* *a* 3 *b*

1. *Ferula Narthex*, Boiss.
a, outer surface, from Dr. Falconer's specimen at Kew.
b, inner surface, from a fruit (having the right margin injured) grown from Falconer's seed at the Royal Botanic Gardens, Edinburgh.

2. *Ferula fœtida*, Regel.
a, outer surface.
b, inner surface. From fruit on Dr. Aitchison's plant in the Kew Herbarium.

3. *Ferula rubricaulis*, Boiss.
a, outer surface (Kotschy, 666).
b, inner surface (Aucher-Eloy, 4614).

4. *Ferula fœtidissima*, Regel.
From a plant grown in the Moscow Botanic Gardens.

6. *Ferula alliacea*, Boiss.
a, outer surface.
b, inner surface. From Dr. Dymock's specimen.

In Nos. 1, 3 and 4 the dark lines represent the vittæ. The vittæ are not visible in the others.

plants. Two of these were sent by him, in the year 1777, to Dr. Guthrie, F.R.S., an English physician resident at St. Petersburg. These were forwarded by Dr. Guthrie to Dr. Hope, then Professor of Botany at Edinburgh, and were planted in the Botanical Gardens there. The plant flowered in 1783 and was figured under the name of asafœtida in the 'Philosophical Transactions of the Royal Society of London,' 1785, art. 5, p. 36, t. 324, and was considered by Dr. Hope to be identical with the asafœtida plant described by Kæmpfer.* The foliage is, however, so different from Kæmpfer's figure that it seems hardly possible that he can have seen that author's work. The dissimilarity of the two plants was pointed out by Sir J. Banks, then President of the Royal Society (*l c.*, p. 38), and Dr. Hope's plant was subsequently enumerated by Willdenow, who adopted Hope's description of the plant, under the name of *Ferula persica*. A specimen of Dr. Hope's plant, which has a distinctly alliaceous odour and taste, still exists in the British Museum Herbarium, as well as an original specimen from Pallas himself. Seeds of this plant were distributed to the Botanical Gardens of Chelsea, Oxford, and Cambridge, and Dr. Dickson's garden at Croydon. The only evidence that the plant is a source of commercial asafœtida rests upon Pallas's statement that it is the true asafœtida plant, and upon Dr. Hope's statement that "in Persia, at the proper season, the root is cut once and again, and from the incisions there flows a thick juice-like cream, which thickened is asafœtida" (*l.c.*, p. 39).

Borsczow (*l.c.*, p. 17) points out that *Ferula persica*, known to the dwellers in the Kirghiz steppes as "*Ilan*," occurs only on the dry ground of the salt, sandy plains; whereas *Scorodosma* (*F. fœtida*, Regel) is found, on the contrary, only on damp pebbly or stony ground on the hills or among the detritus at the foot of mountain precipices—the latter plant being distinguished as *Sassyk kurai*.

It appears doubtful, however, whether the *F. persica* of Borsczow is the *F. persica* of Dr. Hope, for Borsczow remarks (*l.c.*, p. 20) that the *F. persica* growing in the Aralo-Caspian desert differs from Willdenow's plant in the smaller root, usually not exceeding an inch in diameter, with fewer branches, and having a black cortex; in the more distant segments of the leaves of the first and second order, those of the third order being oval and larger, and in having fewer deeply-cut laminæ, also in the inflorescence being much more luxuriantly developed, forming a rounded head as in *F. fœtida*, but on a smaller scale. The root of Dr. Hope's plant is thicker, of a dirty-yellow colour, and more branched. It is a hardy perennial flowering from May to July. The Aralo-Caspian *F. persica* was not known to Borsczow as occurring in Persia. As Willdenow does not give a description of the plant, that published by Dr. Hope is here quoted :—

"*Asafœtida.*

"Planta umbellifera, tripedalis, erecta, ramosa, glauca, flore luteo.

"Radix perennis *Folia radicalia* sed procumbentia, trilobo-ovata, multoties pinnatim divisa; foliolis incisis, subacutis, subdecurrentibus; petiolo communi superne plano, linea elevata longitudinaliter per medium decurrente. Caulis bipedalis, erectus, teretiusculus, annuus, leviter striatus, glaber, nudus præter unam circa medium foliorum imperfectorum conjugationem; petiolo membranaceo, concavo. Rami nudi, patuli; quorum tres inferi, alterni; sustinentur singuli folii imperfecti petiolo membranaceo, concavo. Quatuor intermedii verticillati sunt, supremi ex apice caulis cito, quorum interni erecti. Omnes hi rami summitate sustinent umbellam compositam sessilem terminalem et præterea 3-6 ramulos externæ positos, umbellas compositas ferentes. Hoc modo, rami inferiores sustinent 5, raro 6, ramulos; intermedii 3 et 4; superiores 1 et 2. Umbella universalis radiis 20–30 constat. Umbella partialis flosculis subsessilibus 10–20. Umbella composita sessilis convexo plana. Umbella composita pedunculata hœmisphœricia. Involucrum universale nullum, Involucrum partiale nullum. Perianthium proprium vix notabile. Cor. universalis uniformis. Flosculi umbellæ sessiles fertiles. Flosculi umbellæ pedunculatæ plerumque abortiunt. Cor. propria petalis quinque æqualibus, planis, ovatis; primo patulis, dein reflexis, apice ascendente. Stam. Filamenta 5, subulata; corolla longiora, incurvata. Antheræ subrotundatæ. Pist. Germen turbinatum, inferum. Stylo duo, reflexi. Stigmata apice incrassata. Peri. nullum, fructus oblongus, plano-compressus, utrinque 3 lineis elevatis notatus est. Sem. duo, oblonga, magna, utrinque, plana, 3 lineis elevatis notata.

"Planteo odorem alliaceum diffundit. Folia rami, pedunculo, radix truncus secti succum fundunt lacteum, sapore et odore Asafœtidæ."

The leaves in this species are much more divided than in any of the preceding, and the leaflets are smaller and linear.

In conclusion, the distinctive characters of the asafœtida plants already enumerated may be briefly summarised and compared as follows :—

1. *Ferula fœtida*, Regel.—Leaves bipinnate, ultimate segments lingulate entire; petals white, remaining after the formation of young fruit; umbels grouped near the apex of the stem, with white, crisped hairs; vittæ numerous, minute, not visible to the naked eye; fruit-wing nearly as broad as the seed.

2. *F. Asafœtida*, Regel.—Leaves similar; petals yellow, caducous; the fruit of the wing only slightly broader than half the seed; vittæ as in No. 1; peduncles thickened below after flowering; umbels as in No. 1, and also clothed with crisped hairs.

3. *Ferula Narthex*, Boiss.—Leaves, as in Nos. 1 and 2; rarely serrate at apices; petals yellow, caducous; umbels axillary, from base to apex of plant, not hairy; vittæ solitary or 2 in the dorsal furrows, distinctly visible, slightly branched.

4. *Ferula fœtidissima*, Regel and Schmal.—Leaves, nearly same shape as 1, 2, 3, but with distinctly serrulate margin; petals yellow; vittæ distinctly visible, 1–3 in the dorsal furrows, six on the commissure.

5. *Ferula alliacea*, Boiss.—Leaves obtusely dentate at apex, with spreading segments, cuneate below; fruit-wing one-fifth diameter of seed; vittæ minute, not visible to the naked eye.

6. *F. rubricaulis*, Boiss.—Resembles *F. alliacea*, but the stem is terete; rays of umbel 20–30; fruit-wing only one-half the width of the seed; stem branches purplish-red; vittæ indistinct.

7. *F. teterrima*, Karel. et Kiril.—Leaves quadriternatisect; segments oblong, acute, entire, or 2–3 lobed; vittæ solitary in the dorsal furrows, distinctly visible, 7–8 in the commissure.

8. *Ferula persica*, Willd.—Leaves pinnately decomposed; segments linear, small; petals pale yellow; fruit-wing one-quarter width of seed; vittæ in the dorsal furrows 3–4, numerous in the commissure.

* Kæmpfer 'Amœnitates Exot.', 1712, pp. 535–552.

PAPER PULP IN PHARMACY.*

BY JOHN C. FALK, PH.G.

Filter paper, beaten or shaken into a pulp, can be put to a variety of uses. It answers excellently as a dividing agent for oils and resinous substances in the preparation of aromatic waters, syrups, and elixirs. In the cleansing of turbid aqueous, hydro-alcoholic and saccharine liquids its applications are varied and valuable. In the preparation of aromatic waters, the results of its use surpass those obtained from the articles generally used as such, as cotton magnesium carbonate, precipitated calcium phosphate, talc, "infusorial earth," powdered glass, silica, pumice-stone, kaolin, animal charcoal, or glycerine. To the frequently used magnesium carbonate the objection exists that its solubility is such as to throw out of solution the salts of strychnine, morphine, etc., when dissolved in a liquid made by the intervention of this substance. Cotton neither gives good results nor is easily manipulated. Sugar and alcohol are entirely too prone to cause fermentation in medicated waters. Glycerin is a foreign substance, not always permissible. Most of the substances named are seldom pure enough for use, while most fail to give universally good results.

Paper-pulp proved to be such a desirable medium in the production of medicated waters that a trial of it in the manufacture of some aromatic syrups and elixirs naturally followed. After its repeated use, I can safely say that in purity of product, beauty of appearance, and exquisite flavour, its results are unequalled.

All torn filters, filter trimmings, and scraps of clean filter paper are saved, so that it is seldom necessary to employ entire sheets. For the vast majority of preparations ordinary filter paper will answer excellently. If an exceptional purity be required, chemically pure paper can be employed. Ordinary filter paper is often contaminated by iron, which can be removed by washing the paper first in a dilute nitro-hydrochloric acid, and then with water, until free from acid.

Paper-pulp was first employed in the manufacture of medicated waters by James Raun.† He used 60 grains of paper and 30 minims of oil to make 2 pints of water. My experience has led to the use of 90 grains. The appended formulæ include such as have, in my experience, proven practical:—

For Anise, Caraway, Cinnamon, Fennel, Peppermint or Spearmint Water.—Take of the oil 30 minims; of filter paper 90 grains, and water to make 2 pints. Tear the paper into small pieces, put it into a quart bottle, and drop the oil thereon. Add in small portions 2 pints of water, shaking thoroughly after each addition until the paper is disintegrated. Filter, pouring back the first filtrate. When the liquid ceases to drop, carefully remove the pulp from the filter, press out the remaining liquid into the funnel again, and pour sufficient water on the filter to make 2 pints.

Camphor Water.—Take of—

Camphor	120 grains.
Alcohol	½ fluid ounce.
Filter paper	90 grains.
Water to make	2 pints.

Dissolve the camphor in the alcohol, pour the solution upon the shredded paper contained in a wide dish, and stir it about until the alcohol has nearly all evaporated. Then place the paper into a bottle and proceed precisely as directed above for the other aromatic waters.

To Clear Muddy Water.—In obtaining beautifully clear water for ordinary pharmacal purposes from the horribly muddy water sometimes furnished to the St. Louis consumers, the use of paper-pulp gives eminently satisfactory results.

Shake about 1 ounce of filter paper into a fine pulp, in a bottle, by the gradual adding of ½ a gallon of water. Pour this at once in a plaited filter in a large funnel, and keep it constantly filled by fresh portions of the water. This "bed" will filter many gallons of water as clear as crystal—it matters not how muddy originally.

To filter a liquid having a finely-divided precipitate in a state of resistent suspension, treat it just as directed for muddy water.

To Clarify Turbid Honey or Simple Syrup.—Beat 1 ounce of filter paper for each gallon of material into a pulp in a mortar, using a few ounces of water for the purpose; mix it gradually and thoroughly with the honey or syrup, and heat rapidly to the boiling point. When it has partially cooled, strain through a thick flannel cloth.

For simple syrup, the paper should be the white variety, as the boiling temperature in connection with the use of grey paper is liable to give the syrup a yellowish tinge.

Syrup of Tolu.—Take of—

Tincture of tolu	2 fluid ounces.
Sugar	28 avoirdupois ounces.
Filter paper	180 grains.
Water to make	2 pints.

Pour the tincture of tolu on the paper contained in a bottle, add 2 ounces of the sugar, and shake them together. Gradually add 1 pint of water, shaking well after each addition. Shake the bottle at short intervals during two hours, and then filter. When the liquid ceases to drop, carefully remove the pulp from the filter and press the excess of liquid into the funnel again. Add the sugar, and dissolve by agitation, without the application of heat. Strain through flannel, and pour sufficient water on the strainer to make the syrup measure 2 pints.

Syrup of Ginger.—Take of—

Fluid extract of ginger	1 fluid ounce.
Sugar	30 avoirdupois ounces.
Filter paper	120 grains.
Water, to make	2 pints.

Make this syrup according to the directions given for syrup of tolu.

Syrup of Orange.—Take of—

Sweet orange peel (freed from the inner white portion)	2½ avoirdupois ounces.
Alcohol	5 fluid ounces.
Sugar	28 avoirdupois ounces.
Filter paper	180 grains.
Water, to make	2 pints.

Macerate the orange peel in alcohol during four days: then press out the liquid and pour it into a bottle, on the paper, and continue, as in the preparation of syrup of tolu.

Compound Syrup of Squill.—To prepare this syrup follow the directions of the Pharmacopœia, except that instead of rubbing the liquid with precipitated phosphate of calcium, it is shaken up with 180 grains of filter paper, and filtered therefrom.

Elixirs, Simple or Compound.—In making any elixir, reserve two ounces of water from each pint of elixir with which to form a pulp of 60 grains of filter paper (60 grains to each pint). Add the elixir slowly, and with vigorous shaking, to the pulp mixture contained in a bottle sufficiently large to hold the entire amount. Allow it to stand for two or three days before filtering, shaking it often in the meantime.

For an elixir of salicylic acid, salicylate of sodium, or any other salicylate, the filter paper must be absolutely free from iron, or the preparation will soon become discoloured. For these chemically pure paper, or ordinary paper freed from traces of iron by means of diluted nitrohydrochloric acid, should be used.

* Mo. Pharm. Assoc. Trans., Tenth Annual Session. From the *Western Druggist*, October.

† *Amer. Journ. Pharm.*, 1874.

THE PRACTICAL APPLICATIONS OF ELECTRICITY.*

BY WALTER HENRY PREECE, F.R.S, M.INST.C.E., ETC.

"Canst thou send lightnings, that they may go, and say unto thee, Here we are?" were pregnant words addressed to Job unknown centuries ago. They express the first recorded idea in history of the potentiality of electricity to minister to the wants of mankind. From Job to Franklin is a long swing in the pendulum of time. It was not until that American philosopher brought down atmospheric electricity by his kite-string in 1747, and showed that we could lead it where we willed, that we were able to answer the question addressed to the ancient patriarch. Nearly another century elapsed before this mysterious power of nature was fairly conquered. It has been during this generation, and during the life of the British Association, that electricity has been usefully employed; and it is because I have taken a subordinate position in inaugurating nearly all of its practical applications, that I venture to make the developments of them the text of my address to this section.

People are singularly callous in matters affecting their own personal safety: they will not believe in mysteries, and they ridicule or condemn that which they do not understand. The Church itself set its face against Franklin's "impious" theories, and he was laughed to scorn by Europe's scientific sons; and even now, though commissions composed of the ablest men of the land have sat and reported on Franklin's work in England, France, and nearly every civilized nation, the public generally remains not only ignorant of the use of lightning conductors, but absolutely indifferent to their erection, and, if erected, certainly careless of their proper maintenance. I found in a church not very far from here the conductor leaded into a tombstone, and in a neighbouring cathedral the conductor only a few inches in the ground, so that I could draw it out with my hand Although I called the attention of the proper authorities to the absolute danger of the state of affairs, they remained in the same condition for years.

Wren's beautiful steeple in Fleet Street, St. Bride's, was well-nigh destroyed by lightning in 1764. A lightning rod was fixed, but so imperfectly that it was again struck. In July last (1887) it was damaged because the conductor had been neglected, and had lost its efficiency.

As long as points remain points, as long as conductors remain conductors, as long as the rods make proper connection with the earth, lightning protectors will protect; but if points are allowed to be fused, or to corrode away; as long as bad joints or faulty connections are allowed to remain; as long as bad earth, or no earths exist, so long will protectors cease to protect; and they will become absolute sources of danger. Lightning conductors, if properly erected, duly maintained, and periodically inspected, are an absolute source of safety; but if erected by the village blacksmith, maintained by the economical churchwarden, and never inspected at all, a loud report will some day be heard, and the beautiful steeple will convert the churchyard into a new geological formation.

We have not yet acquired that mental confidence in the accuracy of the laws that guide our procedure in protecting buildings from the effects of atmospheric electrical discharges which characterises most of the practical applications of electricity. Some of our cherished principles have only very recently received a rough shaking from the lips of Professor Oliver Lodge, F.R.S., who, however, has supported his brilliant experiments by rather fanciful speculation, and whose revolutionary conclusions are scarcely the logical deduction from his novel premises.

We are now obtaining much valuable information about the nature of lightning from photography. We learn that it does not, as a rule, take that zigzag course conventionally used to represent a flash on canvas. Its course is much more erratic and sinuous, its construction more complicated, and pictures have been obtained of *dark* flashes whose *raison d être* has not yet been satisfactorily accounted for. The network of telegraph wires all over the country is peculiarly subject to the effects of atmospheric electricity, but we have completely mastered the vagaries of lightning discharges in our apparatus and cables. Accidents are now very few and far between.

The art of transmitting intelligence to a distance beyond the reach of the ear and the eye, by the instantaneous effects of electricity, had been the dream of the philosopher for nearly a century, when in 1837 it was rendered a practical success by the commercial and far-sighted energy of Cooke, and the scientific knowledge and inventive genius of Wheatstone. The metallic arc of Galvani (1790) and the developments of Volta (1796) had been so far improved that currents could be generated of any strength; the law of Ohm (1828) had shown how they could be transmitted to any distances; the deflection of the magnetic needle by Oersted in 1819, and the formation of an electro-magnet by Ampére and Sturgeon, and the attraction of its armature had indicated how those currents could be rendered visible as well as audible.

Cooke and Wheatstone in 1837 utilized the deflection of the needle to the right and the left to form an alphabet. Morse used the attraction of the armature of an electro-magnet to raise a metal style to impress or emboss moving paper with visible dots and dashes. Steinheil imprinted dots in ink on the different sides of a line on paper, and also struck two bells of different sound to affect the ear. Bréguet reproduced in miniature the actual movements of the semaphore then so much in use in France; while others rendered practical the favourite idea of moving an indicator around a dial, on which the alphabet and the numerals were printed, and causing it to dwell against the symbol to be read—the A, B, C instrument of Wheatstone in England, and of Siemens in Germany. Wheatstone conceived the notion of printing the actual letters of the alphabet in bold Roman type on paper—a plan which was made a perfect success by Hughes in 1854.

At the present moment the needle system of Cooke and Wheatstone, as well as the A, B, C dial telegraph, are very largely used in England on our railways and in our smaller post offices. The Morse recorder and the Hughes type-printer are universally used on the continent; while in America the dot and dash alphabet of Morse is impressed on the consciousness through the ear by the sound of the moving armature striking against the stops that limit its motion. In our larger and busier offices the Morse sounder and the bell system, as perfected by Bright, are very largely used, while the press of this country is supplied with news which is recorded on paper by ink dots and dashes at a speed that is almost fabulous.

Sir William Thomson's mirror—the most delicate form of the needle system—where the vibratory motions of an imponderable ray of light convey words to the reader, and his recorder, where the wavy motion of a line of ink spirted on paper by the frictionless repulsion of electricity performs the same function, are exclusively employed on our long submarine cables.

Bakewell in 1848 showed how it was possible to reproduce facsimiles of hand-writing and of drawing at a distance, and in 1879 E. A. Cowper reproduced one's own handwriting, the moving pen at one station so controlling the currents flowing on the line wire that they caused a similar pen to make similar motions at the other distant station. Neither of these plans, the former beautifully developed by Caselli and d' Arlin-

* Presidential Address to the Mechanical Science Section of the British Association at Bath.

court, and the latter improved by Robertson and Elisha Gray, have yet reached the practical stage.

The perfection of telegraphy has been attained by that chief marvel of this electrical age—the speaking telephone of Graham Bell. The reproduction of the human voice at a distance, restricted only by geographical limits, seems to have reached the confines of human ingenuity; and though wild enthusiasts have dreamt of reproducing objects abroad visible to the naked eye at home, no one at the present moment can say that such a thing is possible, while in face of the wonders that have been done no one dare say that it is impossible.

The commercial business of telegraphy, when our thoughts and wishes, orders and wants, could be transmitted for money, was inaugurated in this country by the establishment of the Electric Telegraph Company in 1846, and until 1870 it remained in the hands of private enterprise, when it was purchased by the Government, and placed under the sole control of the Postmaster-General. It has been the fashion to decry the terms of purchase of the various undertakings then at work by those who have not understood the question, and by those who, being politically opposed to the Government in power at the time, saw all their acts, not only through a glass darkly, but through a reversing lens. A business producing £550,000 per annum was bought at twenty years' purchase, and that business has now increased to £2,000,000 per annum. Six million messages per annum have increased to 52,000,000.

Every post office has been made a telegraph office, every village of any size has its wire; messages which used to cost 12*s.* 6*d.* are now sent for 6*d*; a tariff which was vexatious from its unfair variation is now uniform over the United Kingdom, and no one can justly complain of error or delay in the transmission of their messages. Silly complaints are sometimes inserted in the press, of errors which the most elementary knowledge of the Morse alphabet would detect, and little credit is given to the fact that the most perfect telegraph is subject to strange disturbances from terrestrial and atmospheric causes which admit sources of error beyond the control of the telegraphist. A flash of lightning in America may cause an extra dot in Europe, and *man* may become *war*. An earthquake in Japan may send a dash through France, and *life* would become *wife*. A wild goose flying against a telegraph wire might drive it into momentary contact with another wire, and *sight* might become *night*. Every one should know his Morse alphabet, and people should learn how to write. Nine-tenths of the errors made are due to the execrable caligraphy of the present day. At a matter of fact, in ninety-nine cases out of a hundred the telegraphist delivers to the editor of a newspaper "copy" far more accurate than the first proof of his own leader submitted by the printer. The quantity of news transmitted is enormous, an average of 1,538,270 words are delivered per day. The recent convention in Chicago, when the Republican party of the United States nominated their candidate for the presidentship, created so much business that every American paper has chronicled this big thing as unique. Five hundred thousand words were sent on one night; but we in England, when Mr. Gladstone introduced his celebrated Home Rule Bill on April 8, 1886, sent from the Central Telegraph Office in London 1,500,000 words.

The growth of business has led to vast improvement in the carrying capacity of the wires. Cooke and Wheatstone required five wires for their first needle instrument to work at the rate of four words per minute. One wire can now convey six messages at ten times the speed. The first Morse apparatus could work at about five words a minute; we now transmit news at the rate of 600 words a minute. In 1875 it was thought wonderful to transmit messages to Ireland at 80 words a minutes. When I was recently at Belfast I timed messages coming at the rate of 461 words a minute. Duplex working—that is, two messages travelling on the same wire at the same time in opposite directions, the invention of Gintl, of Vienna—is now the normal mode of working; Edison's quadruplex is common; and the Delany system of multiplex working is gradually being introduced, by which six messages are indiscriminately sent in either direction. The telegraphic system of England has been brought to the highest pitch of perfection. We have neither neglected the inventions of other countries, nor have we been chary of exercising inventive skill ourselves, and we have received our full meed of that reward which is always freely bestowed on a British Government official, neglect and abuse. All parts of the civilized world are now united by submarine cables. The *Times* every morning has despatches from every quarter of the globe, giving the news of the previous day. 110,000 miles of cable have been laid by British ships, and nearly £40,000,000 of British capital has been expended by private enterprise in completing this grand undertaking. A fleet of 37 ships is maintained in various oceans to lay new cables and to repair breaks and faults as they occur—faults that arise, among other causes, from chafing on coral reefs, ship's anchors, the onslaught of insects, and earthquakes. The two cables connecting Australia and Java were recently simultaneously broken by an earthquake.

The politician, unmindful of the work of the engineer, is apt to apply to the credit of his own proceedings the growing prosperity of the world. The engineer, however, feels that steam and electricity in his hands have done more to economize labour, to cheapen life, to increase wealth, to promote international friendship, to alleviate suffering, to ward off war, to encourage peace, than all the legislation and all the verbosity of the politician.

The railways of this country are entirely dependent for the conduct of their traffic on the telegraph, and the security of their passengers is mainly due to the working of the block system. A railway, say between London and Bath, is broken up into certain short sections, and only one train is allowed on one section at one time. The presence, motion, and departure of trains is announced and controlled by electric signals, and the outdoor signals are governed by these electric signals. There are few more interesting places to visit than a well-equipped signal box, on one of our main railways. The signalman is able to survey the lines all around and about him by aid of his electric signals; he can talk by telegraph or by telephone to his neighbours and his station-master; he learns of the motions of the trains he is marshalling by the different sounds of electric bells; he controls his out-door signals by the deflection of needles, or the movement of miniature semaphores; he learns the true working of his distant signals by their electrical repetition; machinery governs and locks every motion he makes, so that he cannot make a mistake. The safety of railway travelling is indicated by the fact that while in the five years ending 1878 thirty-five people were killed annually from causes beyond their own control, in the five years ending 1887 the average has been reduced to sixteen. One person is killed in 35,000,000 journeys made by train. Wherever we are dependent on human agency we are subject to human error, and a serious accident very recently at Hampton Wick has shown how the most perfect machinery may be rendered valueless to protect life when perversity, thoughtlessness, or criminality enter as factors into the case.

At the meeting of the Association at Plymouth in 1877, I was able for the first time in this country to show the telephone at work. Since then its use has advanced with giant strides. There are probably a million instruments at work now throughout the

civilized world. Its development has been regularly chronicled at our meetings. As far as the receiving part of the apparatus is concerned, it remains precisely the same as that which I brought over from America in 1877; but the transmitter, ever since the discovery of the microphone by Hughes in 1878, has been entirely remodelled. Edison's carbon transmitter was a great step in advance; but the modern transmitters of Moseley, Berliner, D'Arsonval, De Jongh, leave little to be desired. The disturbances due to induction have been entirely eliminated, and the laws regulating the distance to which speech is possible are so well known, that the specification of the circuit required to connect the Land's End with John O'Groat's by telephone is a simple question of calculation. A circuit has been erected between Paris and Marseilles, 600 miles apart, with two copper wires of 6½ gauge, weighing 540 lbs. per mile, and conversation is easily maintained between those important cities at the cost of three francs for three minutes. One scarcely knows which fact is the more astounding—the distance at which the human voice can be reproduced, or the ridiculously simple apparatus that performs the reproduction. But more marvellous than either is the extreme sensitiveness of the instrument itself, for the energy contained in one heat unit (gram-water-degree), would, according to Pellat, maintain a continuous sound for 10,000 years.

The influence which electric currents exert on neighbouring wires extends to enormous distances, and communication between trains, and ships in motion, between armies inside and outside besieged cities, between islands and the mainland, has become possible without the aid of wires at all, by the induction which is exerted through space itself. On the Lehigh Valley Railway, in the United States, such a system of telegraphing without wires is in actual daily use.

The conduct of telephonic business in England is still in the hands of those who hold the patents, and who maintain a most rigid monopoly. These patents have only a short period to run, and when they expire we may expect to find that England will not occupy the very retired position she holds now as a telephone country. Stockholm has more subscribers than London; there are 15,000 subscribers in and about New York, while the number in London is only 4851.

Electric lighting has become popular, not alone from the beauty of the light itself, but from its great hygienic qualities in maintaining the purity and coolness of the air we breathe. The electric light need not be more brilliant than gas, but it must be more healthy. It need not be cooler than a wax candle, but it must be brighter, steadier, and more pleasant to the eye. In fact, it can be rendered the most perfect artificial illuminant at our disposal, for it can illumine a room without being seen directly by the eye; it can be made absolutely steady and uniform without irritating the retina; it does not poison the air by carbonic acid and carbonic oxide, or dirty the decorations by depositing unconsumed carbon; it does not destroy books or articles of vertu and art by forming water which absorbs sulphur acids; and it does not unnecessarily heat the room.

In our Central Savings Bank in London it has been found, after two years' experience of electric lighting, that the average amount of absences from illness has been diminished by about two days a year for each person on the staff. This is equivalent to a gain to the service of the time of about eight clerks in that department alone. Taking the cost at the "overtime" rate only, this would mean a saving in salaries of about £640 a year. The cost of the installation of the electric light was £3349, and the annual cost of working £700 per annum, say a total annual cost of £1034. The cost of the gas consumed for lighting purposes was about £700 a year, so that on the whole there was a direct saving of something like £266 a year to the Government, besides the material advantage of the better work of the staff resulting from the improved atmospheric conditions under which their work is done.

The production of light by any means implies the consumption of energy, and this can be measured in *watts*, or the rate at which this energy is consumed. A watt is $\frac{1}{746}$ part of a *horse-power*. It is a very convenient and sensible unit of power and will in time replace the meaningless horse-power.

1 candle light maintained by tallow absorbs 124 watts.
1 candle light maintained by wax absorbs 94 watts.
1 candle light maintained by sperm absorbs 86 watts.
1 candle light maintained by mineral oil absorbs 80 watts.
1 candle light maintained by vegetable oil absorbs 57 watts.
1 candle light maintained by coal gas absorbs 68 watts.
1 candle light maintained by cannel gas absorbs 48 „
1 candle light maintained by electricity (glow) absorbs 3 watts.
1 candle light maintained by electricity (arc) absorbs 55 watts.

The relative heat generation of these illuminants may be estimated from these figures.

Though the electric light was discovered by Davy in 1810, it was not until 1844 that it was introduced into our scientific laboratories by Foucault; it was not until 1878 that Jablochkoff and Brush showed how to light up our streets effectually and practically; it was not until 1881 that Edison and Swan showed how our homes could be illuminated softly and perfectly. Unpreparedness for such a revolution produced a perfect panic among gas proprietors; inexperience in the use of powerful electric currents resulted in frequent failure and danger; speculation in financial bubbles transferred much gold from the pockets of the weak to the coffers of the unscrupulous; hasty legislation in 1882 restricted the operations of the cautious and the wise; and the prejudice arising from all these causes has, perhaps fortunately, delayed the general introduction of electricity; but now legislation has been improved, experience has been gained, confidence is being restored, and in this beautiful town of Bath fifty streets are about to be lighted, and we see everywhere around and about us in our English homes the pure glow lamp replacing filthy gas and stinking oil. The economical distribution of the electric current over large areas is annually receiving a fresh impetus. The expensive systems defined in the Act of Parliament of 1882 have entirely disappeared. Hopkinson in England and Edison in America showed how a third wire reduced the weight of copper needed by 66 per cent. Gaulard and Gibbs in 1882 showed how the conversion of alternate currents of high electromotive force to currents of low electromotive force by simple induction coils would enable a mere telegraph wire to convey sufficient electricity to light a distant neighbourhood economically and efficiently. Lane Fox in 1879 showed how the same thing could be done by secondary batteries; and Planté, Faure, Sellon and Parker have done much to prove how batteries can be made to solve the problem of storage; while King and Edmunds have shown how the distribution by secondary batteries can be done as economically as by secondary generators The Grosvenor Gallery Co., in London, have proved the practicability of the secondary generator principle by nightly supplying 24,000 glow lamps scattered over a very wide area of London. The glow-lamp of Edison, which in 1881 required 5 watts per candle, has been so far improved that it now consumes but 2¼ watts per candle. The dynamo, which in the same year weighed 50,000 lbs., absorbed 150 horse-power, and cost £4000 for 1000 lamps, now weighs 14,000 lbs., absorbs 110 horse-power, and costs £500 for the same production of external energy; in other words, its commercial output has been increased nearly six times, while its prime cost has been diminished eight times.

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THE LOCAL GOVERNMENT BOARD AND THE SALE OF FOOD AND DRUGS ACTS.

THE annual report of the Local Government Board just issued gives as usual a summary of the work done under the Food and Drugs Acts for the official year 1887–88, based upon the reports of public analysts throughout the country. Abstracts of these reports are also given in a tabular form. It appears from these returns that the total number of analyses made during the year was 24,440, a number somewhat in excess of those made in the previous year. The population to which these returns relate would amount to about 26,000,000, according to the census of 1881, so that there has been an analysis made for rather more than each thousand persons. It is therefore evident that so far as the powers of the Food and Drugs Acts are capable of being applied as a control of the quality of commodities, they are not exercised to any great extent for the protection it was assumed the public required at the time the Acts were passed. As in previous years, it is still evident that the public generally is indifferent to the subject of adulteration, and does not have recourse to the remedies for that evil which the provisions of the Act afford. In the report of the Local Government Board this fact is again pointed out, and it is stated that the setting in motion of the machinery provided for the suppression of adulteration consequently depends for the most part upon the disposition of the local authorities to exercise their powers of counteracting the practice of adulteration by procuring samples for analysis. Thus it appears that the provisions for enabling individuals to protect themselves have proved almost entirely abortive, and that in regard to the administration of the Food and Drugs Acts it is only by means of a system of official inspection that anything is done towards attaining the objects contemplated by the Legislature. It is instructive in this connection to notice how great is the variation in the relative proportions of population and work done under the Acts in different districts. In London generally there are about twice as many samples analysed in proportion to the population as in the provinces, or about one sample for every 600 persons as against one for every 1,228 persons. In some of the metropolitan districts the administration of the Acts seems to have been more actively carried out, as in the Strand District, where one sample was analysed for every 131 persons, and in St. Giles's, where the proportion was one for every 222. On the other hand it is shown that in the populous district of Newington not a single sample was analysed. That was also the case in the district of St. Martin's in the Fields, and in that of Islington, which is the largest of the London districts, containing a population of considerably more than a quarter of a million, only one sample was analysed for every 2525 persons. Again, in Rotherhithe, with a population of 36,024 only eight samples were submitted to analysis, and of those two were reported to be adulterated. In regard to these populous parts of the metropolis, therefore, it appears that the Food and Drugs Acts are to all intents and purposes a dead letter, and practically of no account whatever. In the provinces a similar state of things prevails, for within the jurisdiction of the magistrates of Berkshire, Oxfordshire and Pembrokeshire not a single sample was analysed, and in like manner the municipal authorities of seventy-two boroughs allowed the provisions of the Acts to be inoperative. Though some of these boroughs were of small population, the fact that the list also includes such towns as Plymouth, Lincoln, Gloucester, Carlisle and Oxford shows that if there be any public benefit to be derived from the Acts the duty of administering them is grossly neglected. In Devonshire, with a population of 406,512 (omitting boroughs which have analysts of their own), only sixty samples were analysed during the year, and in Dorset, Shropshire, Norfolk, Suffolk, Wiltshire, Cambridgeshire, Cornwall, Monmouth, Northumberland, the North Riding of Yorkshire and several Welsh counties, the administration of the Acts was also quite inadequate for ensuring the objects contemplated by them. The case is the same in many populous boroughs, such as Preston (102,283), Norwich (92,848), Middlesborough (55,934), South Shields (56,875), Northampton (51,881) and Ipswich (50,546). In the provincial districts where no samples have been analysed, or where the number has been so small as to afford no security against adulteration, the aggregate population is upwards of five millions.

The facts stated above are amply sufficient to show that as regards a very large proportion of the public no advantage whatever is derived from the Food and Drugs Acts, and on extending the inquiry into the working of the Acts it also becomes evident that their administration is scarcely anywhere carried out so as to constitute an efficient control of the quality of alimentary commodities, and so as to prevent their adulteration. From the tabulated statement of the number and kind of samples analysed during the year it appears that

nearly one-half of them (10,333) were samples of milk; next in order of number to those were the samples of butter analysed (2411) and of spirits (2400), while of the thirteen other articles mentioned in the table and a miscellaneous class there were only 9246 analyses made throughout the entire country, or not more than one analysis for every 3000 persons if the increase of population since 1881 is allowed for. Upon the basis of such an obviously inadequate examination of articles of general consumption as food, it seems quite out of place to form any estimate of the extent to which adulteration is actually practiced in regard to them. At the most the percentages given indicate only the number of samples found to be adulterated, and they give no information as to the extent of the practice of adulteration or as to its decrease or increase. Nevertheless, it is upon that basis that milk is stated in the report to be the chief subject of adulteration, although the percentage of milk samples found to be adulterated was but little in excess of the average percentage of adulterated articles of all kinds enumerated in the table. A new feature is introduced into the present report in the shape of information as to the steps that have been taken when adulteration has been detected. Particulars in regard to that point have been received from ninety-three districts, showing that 1884 samples were there reported against, that proceedings were instituted in 1307 of those cases, and that fines were imposed amounting in the aggregate to £1884, besides costs. The average penalty appears thus to be rather less than 29*s.*, an amount which it is considered can scarcely be in any high degree deterrent, when the profitable nature of adulteration is taken into account. But in some cases the fines inflicted must have been very much less than that amount, for in one case the fine was £20, in two cases £15, in another £12 10*s.*, while in fifteen cases it was £10, and in seventy-one cases it amounted to between £5 and £10. From these data it is inferred that with magistrates so lenient, and with local authorities so inactive as they are shown to be in many districts, there is no ground for surprise that the practice of adulteration should continue to a large extent unchecked. That it does so, however, is obviously only an inference, and not by any means a demonstrated fact. The only safe conclusion to be arrived at is that the Food and Drugs Acts have not been administered so effectively as to ascertain whether adulteration prevails to the extent that has been supposed.

As regards the returns relating to the adulteration of drugs the information furnished by the analysts' reports is extremely meagre. Out of the 24,440 samples of all kinds of articles analysed there were but 441 samples of drugs examined, and according to the returns 48 of these samples were found to be adulterated. No statement is made as to the nature of these drugs nor as to where they were obtained, but in the report of the Board it is mentioned that 29 of the condemned samples were sweet spirits of nitre, and it is added that in many of those cases there probably was no wilful adulteration, but only a reduction of the spirit below the standard strength by evaporation. We cannot suppose that any of the cases so regarded can have occurred where the sweet spirit of nitre was obtained from registered chemists and druggists, from whom it is to be expected that their qualifications for ascertaining the quality of the articles they supply would be exercised so as to prevent them from liability to prosecution under the Food and Drugs Act. The article in question is, however, so generally sold by grocers and others who have no qualification for judging as to its quality, that there is every reason for believing the cases mentioned applied to dealers of that class. The only other information furnished by the report affecting qualified vendors of drugs is the statement that out of 29 cases in which analyses were made to ascertain whether medicines had been compounded in accordance with particular prescriptions it was found that there was only one instance in which that was not the case. No information is given as to the source of the other eighteen samples of drugs that were found to be adulterated.

At the next Evening Meeting of the Pharmaceutical Society, which will be held on Wednesday, November 14, at 8 p.m., a communication from the Research Laboratory will be read entitled "Chemical Observations on Tartar Emetic," by Professor Dunstan and Miss L. E. Boole; and a note will also be read on "Two Resins used by the Ancient Egyptians," by E. M. Holmes, F.L.S.

* * *

By the death of General Prejevalsky, which is reported from Vernoje, the Russian Government no doubt loses a valuable political agent, but science also loses an energetic explorer, whose career was largely determined by his love for botanizing. It may be recalled that he brought back from one of his earlier journeys a number of *Rheum* plants collected in the Tangut country, where the roots were said to yield the variety of rhubarb known as "Kiakhta" or "Khan-su" rhubarb. The plant was determined to be a previously unknown variety of *R. palmatum*, to which the name *Rheum palmatum*, var. *Tanguticum*, was given.

* * *

The next meeting of the Chemical Society will be held on Thursday evening, Nov. 15, when there will be a ballot for the election of Fellows, and the following papers will be read: "The Principles of Thermochemistry," by S. U. Pickering; "Note on the Mixture of Propyl Alcohol with Water," by Professors Ramsey and Young; "Napthalene Derivatives," by Dr. Armstrong and Mr. Wynne; "Note on the Action of Nitric Acid on Ammonium Chloride," by Dr. Matthews, and "Piazine Derivatives," by Dr. Mason.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, November 7, 1888.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Allen, Atkins, Butt, Cross, Evans, Gostling, Greenish, Hampson, Hills, Martin, Newsholme, Nichol, Richardson, Robbins, Savage, Schacht and Symes.

The minutes of the last meeting were read and confirmed.

Retirement of Mr. Baildon.

The President said the Secretary had received a letter from Mr. Baildon, expressing his thanks for the resolution passed last month, and his intention to continue to do all that lay in his power to further the interests of the Society.

Diplomas.

The undermentioned, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Browne, Frank.
Brunyee, Arthur.
Bulmer, Bethel.
Gwillim, Walter Robert.
Hogg, John Alexander.
Howell, Alfred.
Jennings, Richard Tildesley.
Mander, Alfred.
Mead, Frederick James.
Scott, Richard Forder.
Spargo, Herbert.
Tull, Frederick Charles.
White, William Louis.

Elections.

MEMBERS.

Pharmaceutical Chemist.

Herbert Spargo, of Newcastle-on-Tyne, having passed the Major examination and tendered his subscription for the current year, was elected a "Member" of the Society.

ASSOCIATE IN BUSINESS.

William Griffith, of Dalton in Furness, having passed the Minor examination, being in business on his own account, and having tendered his subscription for the current year was elected an "Associate in Business" of the Society.

ASSOCIATES.

The following, having passed the Minor examination and paid as "Apprentices or Students" their subscriptions for the current year, were elected "Associates" of the Society:—

Allez, Peter Arnold.....Guernsey.
Aukland, William Henry .....St. Mary Cray.
Blabey, John Robert .....Woolton.
Blomfield, Thomas Nevill ..... London.
Bransby, Charles Kirby.....Manchester.
Carter, Thomas..... .....Hereford.
Coates, Arthur.....Belper.
Colebank, John .....Carlisle.
Donaldson, George .....Portsea.
Drabble, Thomas Lambe .....Holbeach.
Eyles, John Robert.....Newbury.
Furney, Frank.....Warminster.
Gorfett, William Thomas .....Portsea.
Grayson, John Henry.....Whitehaven.
Harding, Henry Gladstone ...Ealing.
Henderson, Thomas Cuthbert..Lochee.
Hepworth, John Stafford .....Hyde.
Hill, William Henry .....Wolverhampton.
James, William Montford.....Market Drayton.
Johns, Thomas.....Woolwich.
Johnstone, Edward Straus ...Whaley Bridge.
Kerridge, Herbert Malster.....Ipswich.
Knowles, Louis.....Leicester.
Loxley, Charles Herbert .....Doncaster.
Madge, Hubert Abraham.....Ottery St. Mary.
Mitchell, John.....Inverness.
Moore, James Temple.....Southsea.
Pasco, George Sidney .....London.
Roberts, William Arthur .....Bangor.
Rudd, Henry Bulmer .....Bradford.
Seccombe, Charles William ...Southampton.
Smith, Sidney .....Birmingham.
Surfleet, Arthur George .....Gainsborough.
Thomas, Joseph .....Garstang.
Toone, Arthur Henry .....Warminster.
Walmsley, George .....Kingston-on-Thames.
Wansbrough, Edwin G. L. ...Barrow-in-Furness.
White, James Carter.....Grimsby.
Wilkerson, Albert Henry ..... Epsom
Willsher, Charles Garrett .....Dover.
Wiseman, David William .....London.
Wood, John Beaumont .....Huddersfield.
Woodcock, Thomas John .....Norwich.

APPRENTICE OR STUDENT.

Arthur Henry Hocking, Liskeard, having passed the Preliminary examination, and tendered his subscription for the current year, was elected an "Apprentice or Student" of the Society.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

Addition to the Register.

The Registrar reported that—

George Smith, 2, Portland Street, Taunton,

having made a declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been duly supported, his name had been placed on the Register.

Restoration to the Register.

The name of the following person who has made the required declaration and paid a fine of one guinea was restored to the Register of Chemists and Druggists:—

James Johnson Taylor, 71, Embden Street, Manchester.

Chairmanship of the Executive of the North British Branch.

The President said he had received a report from Mr. Hill that at a meeting of the Executive of the North British Branch held on October 24, Mr. Baildon's resignation of the office of Chairman having been announced, Mr. William Gilmour was unanimously elected to fill the vacancy.

Election of a Member of Council.

The Council went into Committee to consider the election of a member of Council in place of Mr. Baildon —resigned. On resuming—

The President moved that Mr. Watt, of Haddington, be elected. He said Mr. Watt's name would recommend itself to the Council, he having taken an active part in pharmaceutical work for some time, and having been Vice-Chairman of the Executive of the North British Branch for two years. He lived so near to Edinburgh that he was practically almost a resident in that city. With the assistance of such a man as Mr. Watt, and that of the Executive and other officers in Edinburgh, he thought the business of the Society in Scotland would be carried on with satisfaction to all concerned. It was obvious that the Council needed

occasionally to specially consult someone from Scotland on Scotch affairs, and it was of great importance that any member of the Council who came from Scotland should be one who took a real interest in the Society, and was thoroughly in touch with the members in Edinburgh and elsewhere. Mr. Watt was reported to have once said that he could not find time to attend to the heavy duties which were entailed by a seat on the Council. But he learned from the Vice-President that there was every probability that if elected Mr. Watt would place his services at the disposal of the members.

The VICE-PRESIDENT had much pleasure in seconding the motion. In a recent visit to Scotland he found that Mr. Watt would be a very acceptable representative, and that members, both in Edinburgh and Glasgow, would be very pleased by his election. He also had an interview with Mr. Watt, and learned from him that he would be willing to undertake the duties which he felt would be somewhat onerous at his time of life, of representing Scotland in London. He believed that in Mr. Watt the members of the Society would have a very able representative.

The motion was carried unanimously, and Mr. Watt's name was added to the Benevolent Fund Committee and the Law and Parliamentary Committee.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee, which recommended sundry accounts for payment, contained no special features.

The PRESIDENT, in moving the adoption of the report and recommendations, said there was nothing with regard to the General Fund which called for any remark. With respect to the Benevolent Fund he was glad to say that the reminder which was usually sent out at this time of the year to those who had not remitted subscriptions earlier, had resulted in the receipt of £238 during the month.

The report was unanimously adopted.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to the widow (aged 44) of a member and subscriber who died recently, leaving insufficient assets to meet his liabilities. (Lancashire.)

£5 to the widow (aged 59) of a registered chemist and druggist, who has had three previous grants of like amount; the last in October, 1886. (London.)

£5 to the widow (aged 64) of a registered chemist and druggist, who had a similar grant in October, 1887. (Worcestershire.)

£15 to the widow (aged 61) of a former member who was for many years an annuitant. (Surrey.)

£10 to a registered chemist and druggist (aged 50) who was in business for nineteen years, but continued ill-health has for a long time rendered him unfit for any occupation. His wife is endeavouring to make a living in a small business. (Kent.)

£10 to a former associate (aged 67) for many years dispenser at a hospital, but now unable to find employment. (London.)

Six other applications the Committee did not recommend the Council to entertain.

A letter from Mr. T. C. W. Martin respecting organized effort in London on behalf of the Fund had been deferred for further consideration.

The VICE-PRESIDENT, in moving the adoption of the report, said it was very satisfactory to the Committee to find there had been that addition to the income during the month to which the President had alluded just now. There was no case in the applications which called for special remark. Mr. Martin's letter contained a suggestion that London should be thoroughly canvassed for subscriptions in the various districts, something on the same lines as were followed by some local secretaries in the provinces. The only question was whether men could be found who would undertake the work. The Committee would consider the matter further, and if possible carry out the suggestion.

Mr. RICHARDSON asked how long it was since there had been a whip up in London.

The PRESIDENT said there was a whip last year in connection with the anniversary, but there had never been, so far as he knew, any systematic canvass in London.

Mr. RICHARDSON said he understood there had been a difficulty as to the division of London into districts, and it occurred to him that the divisions adopted by the County Council would be well to follow.

The VICE-PRESIDENT said the Committee had that idea in mind.

Mr. ALLEN remarked that this was no new idea; it was considered last year or the year before, and he thought the difficulty of dividing London into districts was found so great that it was left to voluntary effort, and in some quarters a whip was made.

Mr. ROBBINS thought the difficulty was not so much in dividing London into districts as to find persons who would undertake the work in them.

The VICE-PRESIDENT said the matter would not be lost sight of.

The Council went into committee to hear further details regarding one of the applications.

On resuming the report and recommendations were unanimously adopted.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
July	Day . .	508	35	4	20
	Evening .	101	11	1	5
August	Day . .	120	13	1	5
September	Day . .	107	21	1	8

Circulation of books.	Town.	Country.	Total.	Carriage paid.
July	131	134	265	£1 11 11
August. . . .	48	66	114	1 1 5½
September . .	62	101	163	1 6 7½

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

British Pharmaceutical Conference, Unofficial Formulary, 1888. 2 copies. From the CONFERENCE.

Chemists' Assistants' Association, Proceedings, 1887–88. 2 copies. From the ASSOCIATION.

Stirling (G.), Notes on Dispensing, 2nd ed. 2 copies.

— Table of Organic Materia Medica. 2 copies. From the PUBLISHER.

Art of Dispensing, 1888. From the PROPRIETORS of the CHEMIST AND DRUGGIST.

Institution of Civil Engineers, List of Members, 1888. From the INSTITUTION.

Glasgow University Library, Notes on its history, etc., 1888. From the UNIVERSITY.

University College, Dundee, Calendar, 1888. From the COLLEGE.

Owens College, Manchester, Calendar, 1888. From the COLLEGE.

Royal Dublin Society, Scientific Proceedings, new ser., vol. 5, pts. 7–8; vol. 6, pts. 1–2.

—Scientific Transactions, ser. 2, vol. 3, no. 14; vol. 4, no. 1. From the SOCIETY.

St. Bartholomew's Hospital, Statistical Tables for 1887. From the HOSPITAL.

New South Wales, Technological Museum, Report for 1887. From the MUSEUM.
Canada, Geological and Natural History Survey, Annual Report for 1886. From the SURVEY.
Illinois Board of Pharmacy, Annual Report for 1887. From the BOARD.
New York State Pharmaceutical Association, Proceedings, 1888. From the ASSOCIATION.
Philadelphia College of Pharmacy, Annual Report of the Alumni Association, etc., 1888. From the ASSOCIATION.
U. S. Department of Agriculture, Sugar-producing Plants, Record of Analyses, 1888. From the DEPARTMENT.
Macqret (G.), Étude sur l'Aloès, 1888. From the AUTHOR.
Notice biographique sur H. Lepage, par A. Malbranche, 1886. From M. C. PATROUILLARD.
Société des pharmaciens de l' Eure, Bulletin, no. 13. From the SOCIÉTÉ.
Flückiger (F. A.), Ueber Aschenbestimmung, 1888.
—Englische Beiträge zur Geschichte der Pharmacie und Botanik, 1888.
Eberhardt (L. A.), Über den Japantalg, 1888. From Prof. FLÜCKIGER.
Paschkis (H.) and F. Obermayer, Ueber die Resorption des metallischen Arsens, 1888. From Dr. PASCHKIS.
Schär (E.), Die Arznei- und Genussmittel in ihrer commerciellen und ethnographischen Bedeutung, 1888. From the AUTHOR.
Alpe (E. N.), Handy book of Medicine Stamp Duty, 1888. From the PROPRIETORS OF THE CHEMIST AND DRUGGIST.
University College, London, Calendar, 1888. From the COLLEGE.
Manchester Literary and Philosophical Society, Memoirs and Proceedings, Series 4, vol. 1. From the SOCIETY.
Mason Science College, Calendar, 1888. From the COLLEGE.
Royal College of Surgeons of England, Calendar, 1888. From the COLLEGE.
Macoun (J.), Catalogue of Canadian Plants, part 4. From the GEOLOGICAL AND NATURAL HISTORY SURVEY OF CANADA.
Quincy (J.), English Dispensatory, 9th ed., 1733. From Mr. W. H. COTTERELL.
City of London College, Calendar, 1888. From the COLLEGE.

For the Library in Edinburgh—

Art of Dispensing, 1888. From Mr. PETER MACEWAN.
Heriot-Watt College, Edinburgh, Calendar, 1888. From the COLLEGE.
New South Wales, Technological Museum, Report for 1887. From the MUSEUM.
American Pharmaceutical Association, National Formulary of Unofficinal Preparations, 1888. From the ASSOCIATION.
Philadelphia College of Pharmacy, Annual Report of the Alumni Association, etc., 1888. From the ASSOCIATION.
Ephemeris, vol. 3, no. 3. From Dr. SQUIBB.
Bertolotti (A.), Notizie e documenti sulla storia della farmacia e dell'empirismo in Roma. From the AUTHOR.

The Committee recommended that the undermentioned works be purchased:—

For the Library in London—

Alpe, Handybook of the Medicine Stamp Duty, 1888.
Extra Pharmacopœia, 5th ed. *Second copy.*
Prantl and Vines, Botany, 5th ed.
Durand (T.), Index Generum Phanerogamorum, 1888.
Zeitschrift für physiologische Chemie, vols. 1–5.

For the Library in Edinburgh—

Stillé and Maisch, National Dispensatory, 4th ed.
Extra Pharmacopœia, 5th ed.
Johnston, Chemistry of Common Life, latest ed.
Meyer, Modern Theories of Chemistry.
Hayward, Botanist's Pocket Book.
Holmes, Botanical Note Book.
Lubbock, British Wild Flowers.

The Committee also recommended that copies of the United States Dispensatory and Piesse's Art of Perfumery be transferred from the London Library to Edinburgh.

The Librarian reported that at the annual examination of the books in the London Library with the Catalogue the undermentioned works were missing:—

Beasley, Druggist's Receipt Book, 7th ed., 1872.
Fownes, Chemistry, Actonian Prize, 1844.
Goodeve, Principles of Mechanics, 2nd ed., 1876.
Muter, Organic Materia Medica, 2nd ed., 1878.
Pereira, Selecta è Præscriptis, 17th ed., 1881.
Ramsey, Chemical Theory, 1884.
Reynolds, Experimental Chemistry, part 2.
Roscoe, Elementary Chemistry, 1873.
Stewart and Gee, Practical Physics, vol. 1, 1885.
Wanklyn, Tea, Coffee and Cocoa, 1874.
Wills, Vegetable Materia Medica, 6th ed., 1883.
Woodward, Arithmetical Chemistry, parts 1 and 2, 1882-83.

The Librarian presented his report of the annual meeting of the Library Association held in Glasgow.

The Committee had considered the estimate for printing the Library Catalogue, and recommended that 1000 copies be issued.

Museum.

The Curator's report had been received, and included the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
July	Morning .	511	39	2	19
	Evening .	75	9	1	3

The attendance during August was 41, and during September 123.

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Fifty-five specimens of drugs, chiefly from the Southern States of North America. From the DIRECTOR, Kew Gardens.
Specimens of the twig bark of *Euonymus atropurpureus.* From Messrs. PARKE, DAVIS and Co.
Specimens of the flowers of *Pandanus odoratissimus*; of arrowroot from Gondal; of the fruit of *Sterculia urens.* From Mr. J. G. PREBBLE, Bombay.
Specimen of Citrate of Caffeine, prepared from denatured tea. From Messrs. HOWARD and SONS.
Specimen of Block Shellac. From Mr. HATFIELD.

For the Museum in Edinburgh—

Specimen of Biennial Henbane. From Messrs. PINKERTON, GIBSON and Co., Edinburgh.
Specimen of Coto Bark. From Mr. PETER MACEWAN, London.

To the Herbarium—

Thirty specimens of East Indian medicinal plants. From Mr. J. G. PREBBLE, Bombay.

The staff of the Society's School had attended and reported on the respective classes under their charge.

A communication from Professor Green had been considered, and it was recommended that ten addi-

tional microscopes be purchased, similar to those procured last year.

The PRESIDENT moved the adoption of the report and recommendations. With regard to the extra microscopes he mentioned that they were required in consequence of the success of the practical class in botany, nearly the whole of the botany class having joined it.

The report and recommendations were unanimously agreed to.

GENERAL PURPOSES.

The report of this Committee included the usual letter from the solicitor reporting progress on the cases which had been placed in his hands. One defendant had paid into court £5 10*s*. penalty and costs.

The Committee had considered a case recently brought before it, and on further information recommended proceedings.

The Council as usual went into committee to consider the report.

On resuming, the report and recommendation were unanimously adopted.

CARBOLIC ACID.

The SECRETARY reported that he had received the following letter from the Privy Council:—

"Council Office, Oct. 11, 1888.

"Sir,—I have submitted to the Lord President of the Council the resolution contained in your letter of the 4th inst., of the Pharmaceutical Society, that carbolic acid ought to be deemed a poison within the meaning of the Pharmacy Act, and ought to be deemed a poison in the second part of the Schedule A of the said Act.

"The Lord President directs me to state, for the information of the Council of the Society, that the question has been considered, but that the attention of the Privy Council shall be further directed to it.

"I am, Sir, your obedient servant,

"HERBERT M. SUFT.

"The Secretary, Pharmaceutical Society,
"17, Bloomsbury Square, W.C."

REPORT OF EXAMINATIONS.

October, 1888.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (17th)	6	3	3
„ (24th)	6	5	1
„ (25th)	6	5	1
	— 18	—13	— 5
Minor (17th)	27	11	16
„ (18th)	28	14	14
„ (19th)	27	15	12
„ (24th)	27	12	15
„ (25th)	25	14	11
„ (26th)	28	16	12
	—162	—82	— 80
	180	95	85

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Major (16th)	1	0	1
Minor (16th)	11	6	5
„ (17th)	13	6	7
„ (18th)	13	8	5
„ (19th)	10	5	5
	—47	—25	—22
	48	25	23
Total for Great Britain	228	120	108

Preliminary Examination.

Candidates Examined.	Passed.	Failed.
260	139	121.

Twenty-one certificates by approved examining bodies were received in lieu of the Society's examination.

CERTIFICATES OF THE SCOTCH EDUCATION DEPARTMENT.

The PRESIDENT reminded the Council that about six months ago a communication had been received from the Scottish Education Department, which had instituted a series of examinations at the higher schools in Scotland in various subjects, on which they granted what were termed "leaving certificates." The certificates were given very much on the same general conditions as the science and art certificates, the papers being separate for each class. Besides the subjects required for the Preliminary examination they included German, Mathematics and a number of other subjects. When this system was introduced some months ago an inquiry was made whether the Society would accept these "leaving certificates" in lieu of the Preliminary examination, and as it was stated that the Medical Council had agreed to accept them, the Council had ordered a letter to be written to the Department to the effect that if the examination came up to the required standard the certificates would be accepted. Since then the first examinations had been held, and the papers had been before both Boards of Examiners, who were of opinion that certain certificates ought to be accepted. It was necessary for that purpose that a resolution should be passed by the Council, and he therefore moved:—

"That the Scotch Education Department be approved as a legally constituted examining body, the honours and first grade certificates of which the Boards of Examiners are authorized to accept in lieu of this Society's Preliminary examination, provided the certificates in English, Latin and Arithmetic are obtained at any one annual examination."

He had several sets of the examination papers before him, if any gentleman liked to inspect them.

Mr. ALLEN seconded the motion, which was carried unanimously.

The Council went into committee to consider a special report on the recent Preliminary examination. The Council then resumed.

POISON REGULATIONS.

A letter had been received from the Secretary to the Liverpool Chemists' Association enclosing the following resolution, passed at a meeting on the 1st inst.:—

"That in the opinion of this meeting it is desirable that regulations be made by the Council of the Pharmaceutical Society for the keeping, selling and dispensing of poisons, with a view of submitting the same to the Privy Council so that they may become law."

Mr. SYMES being called on by the President to move the following resolution, of which he had given notice:—

"That this Council recommends the members of the Society to adopt and submit to the Privy Council for approval regulations for keeping, selling and dispensing poisons under the provisions of the Pharmacy Act, 1868,"

said he rose with a serious sense of responsibility to move in this matter——

Mr. GOSTLING moved that the Council go into committee.

Mr. BUTT seconded the motion.

Mr. HAMPSON asked if there could not be any discussion on the question of going into committee.

The PRESIDENT said this question was generally put

without debate. The motion to go into committee was then put and carried by a large majority.

The Council then went into committee.

After some time spent in discussion the Council resumed, and the PRESIDENT announced that the motion of which Mr. Symes had given notice had dropped.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held at 103, Great Russell Street, on Thursday, November 1, the President, Mr. E. J. Millard, in the chair.

The minutes of the previous meeting having been read and confirmed, and several new members proposed, the President called upon Professor J. R. Green to deliver his lecture entitled :—

THE CHEMICAL PROCESSES WHICH ACCOMPANY THE GERMINATION OF THE SEED.

The subject of the lecture, said the Professor, was partly chemical and partly biological. The seed being the starting place of the new plant, its condition largely betokens the course of life to be followed by the developing plant. During its round of chemical and physical changes, it had constantly to meet with conditions antagonistic to its vital functions, and hence special efforts had to be made at certain periods to overcome these opposing forces, and to maintain continuity of race and vitality. Thus some plants, as they knew, were able to exist only one year, some two, whilst others survived for a very considerable period. But though the period of their existence might vary, there was this point in common, that new individuals must be propagated from the parent through the seed, or in the case of the lower plants from the bodies called spores.

The spore, however, in the higher plants, was the forerunner of the seed, and they must, therefore, bear in mind that the seed was really the plant, already in an early state of development, and merely the resting place, so to speak, for further progress. Most of them were tolerably familiar with the physical structure of the seed. An external coat, more or less impervious to moisture, an internal mass of store material, characterized generally by the absence of moisture, and inside this the embryonic plant: the axis and cotyledons. In some cases the embryo filled the entire internal cavity of the seed, whilst in others the embryo was imbedded in the store materials, and it would appear to be a matter of indifference whether the store materials were inside or outside the embryo. Seeds had in this respect been divided into albuminous and exalbuminous, but these distinctions bore more upon classification than upon physiology. It was to the internal cells of the seed that they must look to see the form in which the materials were found to be stored for the nourishment of the growing plant. Physiologists had divided these materials into three groups :—

1. Carbohydrates. 2. Proteids or nitrogenous bodies, and 3. Fats. Some others also existed which did not belong to these classes, as the glucosides.

Chief among the carbohydrates was starch, whose formula was as they knew some multiple of $C_6H_{10}O_5$. Its physical appearance was known to most of his audience, but the chief point he asked them to remember was its entire insolubility in the fluids of the plant; hence the necessity for its alteration, previous to assimilation by the growing plant. Another important carbohydrate was sugar, of the formula $C_6H_{12}O_6$. This was already soluble, and thus accessible by the plant for nutritive purposes. Chief among the proteid group were the aleurone grains, so conspicuous a feature in the microscopical examination of such seeds as the castor oil and lupin. Aleurone was almost insoluble in the plant fluids, although slightly soluble in water.

Some of the fatty group, as oil, also were insoluble and difficult to diffuse. The reserve materials therefore were generally insoluble, and also indiffusible. In what manner were these rendered assimilable and capable of nourishing the growing plant? There was a great class of bodies called ferments, one of which played, as they knew, an indispensable part in the formation of alcohol from sugar. This change was effected by an *organized* ferment, but in plants the ferments which occurred were not organized structures, and were marked by peculiar characteristic features. Their composition was unknown, and it was equally uncertain where they originated or whither they went, and there was moreover no means of ascertaining their absolute purity. The action of these ferments was arrested at a temperature of 0° C.; from this point upwards their activity gradually increased, and the full power of them was probably best seen at the blood heat, while their activity was again arrested at a temperature of 100° C., at which temperature they were more or less completely destroyed. The medium in which they were placed, was also a most important factor in the accomplishment of their work, for some were most active in an acid medium, and others refused to work in the presence of an acid, and required for their labours an alkaline medium, and others a neutral one.

But the most striking feature of all of them was, they did not become at all exhausted by long activity; their energy was not derived from themselves. There was no stage, for instance, in the action of diastase on starch, when they could say that there was present a body consisting of starch *plus* diastase. The ferments were extremely sensitive to the action of certain inorganic substances; thus, too much neutral salt would interfere with their utility. There had been discovered several ferments in plants. One acted on carbohydrates, such as starch, one upon fats, one on the proteids, and one upon glucosides, and the aim of all these ferments was to alter the reserve food materials and to render them fit for assimilation.

The ferment which acted upon starch was called diastase : a similar body was also found in animals. If to a thick paste of starch some diastase was added a change at once began to take place in the character of the starch; its thickness disappeared, the blue reaction with iodine changed to a violet, then red, and finally also disappeared; and ultimately in place of the thick starch paste remained a clear transparent fluid. The first stage in the action of diastase on starch was the formation of "soluble starch." This was followed at once by dextrin, which was the body to which the formation of the red colour with iodine was due. By the further action of the ferment the dextrin became converted into sugar, and with this the work of the diastase was finished, and no further change took place. The chemical change that took place in the reaction just described was the rearrangement of the molecule of starch, accompanied by the absorption of a molecule of H_2O. Ferments thus produced a hydrolytic action. The aleurone grains were a mixture of proteids varying as to their solubility; the two chief of these were known as globulin and albumose, the formula of both being unknown. Globulin was not soluble in water, but was soluble in weak solutions of neutral salts. Albumose was soluble in water, and precipitated by nitric acid; this precipitate dissolved at near the boiling point, but was again precipitated as the liquid cooled. This was peculiar, as heat rendered most proteids insoluble. Gorup-Besanez had

long ago demonstrated the existence of a proteolytic ferment in growing plants, and though his conclusions had been denied, they had since been proved to be correct, and from the insoluble proteid was formed a soluble peptone found in germinating seeds. The peptone, however, was not the final stage, but merely a resting place, and an example of the completely transformed proteid was to be seen in such bodies as asparagin and other amides. The ferment acting upon fats was not so well known, but it undoubtedly existed.

The question now arose in what manner was the action of these ferments incited to begin, and why did it not take place in the resting seed? There were bodies in seeds called zymogens, and when these met with favourable conditions they became converted into the ferments. When a seed was put in the ground it met with moisture and warmth, vegetable acids at once appeared, and the zymogen developed into ferment, and so life was resumed where it had been arrested.

To look at the converse process: they could not trace the presence of sugar, or amides, for instance, up to the growing point, but only up to a short distance behind; hence the converse process must take place above this point, for there were found proteids containing also phosphorus and sulphur, and from these was formed the protoplasm or living substance of the plant. The nature of the chemical processes undergone in the germinating seed was one of great importance, and when chemists could tell them more of it, they would increase the debt of gratitude which botanists and physiologists owed to them.

At the conclusion of the lecture—

The President felt sure that the appreciation and attention of the members would more than repay Professor Green for the trouble he had taken in preparing and delivering such an admirable lecture. He could not help feeling, during the course of his interesting remarks, that the mantle of Professor Bentley had fallen, worthily and well, upon the shoulders of his successor. Criticism upon the statements that had been made would be dangerous, and he left this task for others that might be more rash. The reference to ferments was deeply interesting and instructive, but he ventured to think that the temperature at which the bodies were most active varied more than was generally supposed. Thus pepsin, which was formerly to be tested at blood heat, had been found to be more active at 130° F., and the Pharmacopœia had adopted this higher temperature. He cordially invited all to join in the discussion, as he was sure Professor Green would most generously reply to any questions that might be asked.

Mr. Williams expressed his gratification at the admirable lecture they had listened to, and would like to ask Professor Green whether he considered vital force necessary to the action of these ferments, and also whether he considered peptone to be a ferment itself or a mixture of ferment and semi-digested matter?

Mr. Salter asked whether the Professor considered the glucosides the product of the action of a ferment and a nutritive substance, or whether they were not to be regarded as waste products. As neutral salts interfered so much with fermentive action, he should be glad to know if the practice of taking salt with meals was to be condemned.

Mr. Fawsett asked whether any theory had been put forward by scientific men as to what a ferment really was, and as nutritive matter and heat were necessary to their action, whether they might not be regarded as some form of life?

Professor Green, in reply to Mr. Fawsett, said that at the meeting of the British Association for the Advancement of Science, some of the first chemists and physiologists of the day had started the question as to what was a ferment, but were unable to offer a reply. Of course such organized ferments as yeast were no doubt to be regarded as living, but having regard to the method of precipitation and reprecipitation employed in procuring such a substance as pepsin, he could not think they were in anyway to be looked upon as living. In reply to Mr. Salter's question, salt, when taken into the stomach, was so quickly diffused that it had not time to affect deleteriously the action of the digestive ferments, and they knew that salt was necessary to perfect nutrition and health. Glucosides were certainly in some cases to be looked upon as nutritives, as in the case of tannin, which yielded sugar. In reply to Mr. Williams, he could say that peptones certainly were not ferments, but intermediate bodies, for they would stand boiling, which ferments would not, and were, however, present in the endosperm, but not in the absorbing plant. Vital force was not of course present in the ferments by themselves.

Mr. Ellwood, in proposing a vote of thanks to Professor Green for his able, lucid and interesting lecture, said that the subject of it was one that pharmacists were not able always to grasp thoroughly for want of time, and Professor Green had acted the part of the good Samaritan in bringing it down to them in such an admirably clear manner. They were too apt, perhaps, to regard knowledge of physiological botany as a matter of sour grapes, but the manner in which the Professor had lectured to them made his subject anything but dry. He begged to propose a sincere vote of thanks to Professor Green.

Mr. Ord seconded the motion, which was carried with acclamation.

Professor Green having acknowledged the vote, the proceedings terminated.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The sixth general meeting of the thirty-ninth session was held at the Royal Institute on Thursday evening, October 25, the President, Mr. A. H. Samuel F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed, and several donations announced.

A vote of thanks having been accorded to the donors, Mr. H. B. Thornton, F.C.S., was elected a member.

The next business was "A Discussion upon the Advisability of Adopting Regulations for the Keeping, Selling and Dispensing of Poisons," and the President, in introducing the subject, spoke of its importance to retail chemists, and regretted that there were not more members present.

Mr. T. F. Abraham said that the meeting could scarcely be considered a representative one for the discussion of such a subject, and moved that the discussion be adjourned to a meeting to be held that day week at four o'clock in the afternoon.

The motion was seconded by Mr. B. Dickens, and carried unanimously.

A note was then read upon—

The Estimation of Citrates and Tartrates when Mixed.

BY J. S. WARD, F.C.S.

Mr. Ward briefly described some experiments he had made in the quantitative analysis of mixtures of these salts, and said that working upon known quantities the results obtained were in every case a little too low. The methods adopted after some preliminary experiments were:—

(1) To acidify a solution of the salts of potassium

with acetic acid, evaporate the mixture to dryness, and exhaust the residue with a mixture of methylated spirit 2 parts and water 1 part. The insoluble portion ($KHC_4H_4O_6$) was dissolved in hot water and titrated with normal solution of sodic hydrate. The solution (citrate) was heated over a water-bath to drive off spirit, heated with excess of calcic chloride, and evaporated to dryness. The residue was washed with boiling water, and the residual citrate of calcium dried and weighed.

It was found that both citrate and tartrate came out a little too low, showing (*a*) that calcic citrate is apparently slightly soluble in boiling water, and (*b*) that acid tartrate of potassium in presence of citrates is slightly soluble in the diluted spirit mentioned, although apparently quite insoluble in it when alone.

(2) To add excess of calcic citrate to a solution of the mixed salts in the cold and allow it to stand for twelve hours, then filter and wash the precipitate with cold water, mixing the washings with the filtrates.

The precipitate (tartrate of calcium) was collected, dried and weighed; the filtrate (citrate of calcium) was evaporated to dryness, exhausted with boiling water, and the residue collected, dried and weighed.

It was observed that both citrate and tartrate came out a little too low, from which it is inferred (*a*) that tartrate of calcium in the presence of a citrate is not completely precipitated in twelve hours, although when alone it is; (*b*) that citrate of calcium is slightly soluble in boiling water, as before observed.

Mr. Ward in conclusion said he had brought the matter under the notice of the meeting because he found that the results of several analyses were fairly constant, a fact that would lead anyone operating upon mixtures of unknown quantities to assume that the processes gave accurate results, whilst in reality this is not so.

At the close a vote of thanks was proposed by Dr. Symes, seconded by Mr. B. Dickins, and unanimously accorded to Mr. Ward for his paper, and the meeting terminated.

The seventh general meeting of the thirty-ninth session was held at the Royal Institution on Thursday afternoon, November 1, the President, Mr. A. Samuel, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed, and the adjourned "discussion upon the advisability of adopting regulations for the keeping, selling and dispensing of poisons" proceeded with.

The President in introducing the subject said that he believed most chemists in that city and throughout England had some regulation of their own for keeping poisons, but it was thought necessary by certain gentlemen in the Council of the Pharmaceutical Society that certain regulations should be made compulsory. No doubt every chemist would value such regulations. The point of difference was that some chemists objected to be dictated to by the Council of the Pharmaceutical Society, believing that they could regulate this matter for themselves. With reference to carbolic acid, which had caused several deaths in Liverpool lately, although the subject was not immediately connected with that under discussion, still it bore upon it indirectly, and it might be thought necessary to express an opinion from this Association that carbolic acid be added to the schedule of poisons.

Dr. Symes said he would explain in a few words why he accepted the responsibility at the present time of bringing this matter forward. The Pharmacy Bill of 1868 was allowed to pass on the assurance of certain members of the Pharmaceutical Council, Mr. Sandford and others, that regulations regarding the keeping, selling and dispensing of poisons would be drawn up by the Pharmaceutical Society and made compulsory. These regulations had not up to the present been submitted to the Privy Council. For this reason he had given notice at the recent meeting of the Council of the Pharmaceutical Society that he would move a resolution for the reconsideration of the question. He considered it would be a great advantage to all the chemists in the United Kingdom, and it would be furthering their own interests to keep faith with the Privy Council in this matter, and it would be for the protection of the public.

Mr. Dickins approved of keeping dangerous poisons by themselves. Restriction would be useful for their own sakes as well as for the public. He moved the following resolution:—"That in the opinion of this meeting it is desirable that regulations be made by the Council of the Pharmaceutical Society for the keeping, selling and dispensing of poisons with a view of submitting the same to the Privy Council, so that they become law."

The motion was seconded by Mr. Hockin, supported by Messrs. Bain, Day, Mackinley, Smith and Aris, and was unanimously carried.

The Honorary Secretary was instructed to send a copy of the resolution to the Council of the Pharmaceutical Society.

Mr. Hockin then moved, "That this meeting is of opinion that the resolution passed by the Council of the Pharmaceutical Society on October 3, 1888, declaring that carbolic acid ought to be deemed a poison within the meaning of the Pharmacy Act, 1868, should be confirmed by the Privy Council, and a petition be sent to the Privy Council to this effect." This was seconded by Mr. Bain, Honorary Secretary, and carried unanimously, and the meeting then terminated.

Parliamentary and Law Proceedings.

Prosecution under the Medicine Stamp Act.

At Bow Street, on Friday, November 2, George P. Pond, chemist, of Fleet-street, was summoned for selling patent medicines without the necessary Inland Revenue stamp.

It was contended on defendant's behalf that the articles sold, "corn solvents" and such like things, were not contemplated by the Act of George II., under which the proceedings were taken. A corn was not an "ailment of the body."

Mr. Bridge: How about toothache?

Mr. Rose-Innes, who appeared for Mr. Pond, was bound to admit, from personal experience, that that was an ailment.

Mr. Bridge decided that this and other articles sold by the defendant came within the statute, and imposed a penalty of £5, and costs 8*s*. In two or three cases he held that the charge had not been proved—such as, for instance, when concentrated essence of ginger was sold, and another where a compound was described as a tooth paste for beautifying the gums and preventing toothache. Pear's soap was said to beautify the skin. Preventing a disease was different from curing one. A tooth tincture for curing toothache came under the word "medicament."—*Times.*

Excise Prosecution for Use of Methylated Spirit in Preparing a Medicine.

At the Mansfield Petty Sessions on Thursday, Nov. 1, before Capt. Need, R.N., and Mr. W. Hollins, jun., Mr. J. J. Wharmby, wholesale and retail chemist, of Mansfield, was summoned at the instance of the Commissioners of Inland Revenue to recover a penalty of £100 for selling sweet nitre which, on analysis, was found to contain methylated spirit.

Mr. Squire said he appeared on behalf of the Commissioners of Inland Revenue to support an information to recover a penalty of £100 imposed by section 130 of

Acts 43 and 44 of Vict. 24. The Bench would see that the Act forbids the use of methylated spirit in the preparation of any article which could be either consumed as a beverage or internally as a medicine. This was introduced into the Spirits Act not only for the purpose of protecting the revenue derived from duty on spirits, that is to say in preparations or medicine to be prepared with spirit which paid duty at 10*s.* per proof gallon, but it was also inserted at the instigation of the Pharmaceutical Society of Great Britain, for the protection of the public, in seeing that they should have these medicines and drugs properly prepared with spirit which was palatable but not nauseous. Methylic alcohol itself was palatable, but was unpalatable in the crude form of naphtha, a spirit distilled from wood, which had been selected as the most nauseous thing the Commissioners could find for the purpose of mixing with proper duty paid spirit, in order that that spirit might be used in reducing, and mixtures of this kind were duty free. So much for the law. The facts of the case were that an officer of the Inland Revenue in the neighbourhood of Mansfield had reason to believe that methylated spirit was to be found in certain articles sold by Mr. Wharmby. He purchased one or two preparations, and on July 12 last, the date mentioned in the information, purchased at Mr. Wharmby's shop a small sample of sweet spirit of nitre, one sample of paregoric elixir, and also one of laudanum. He also purchased at some other shop of Mr. Wharmby two other samples of laudanum, and at another shop, in which Mr. Wharmby was believed to have an interest, he purchased another sample of laudanum, so that he had six samples, which he sent to the laboratory at Somerset House for analysis. They had been examined, and it seemed that the spirit of nitre contained methylated spirit. The other samples which were examined were found to be free from it. There was no question about denying the thing. The result of the analysis was communicated to Mr. Wharmby, and his explanation asked for. He replied that he purchased the article and sold it in exactly the same state. The Commissioners ordered an information to be obtained for the recovery of the penalty. Upon that, Mr. Hibbert, who appeared that day, addressed a letter to the Commissioners of Inland Revenue giving the same explanation, and pointed out, though he did not know he was prepared to make any point of it that day, that a sample had not been left with Mr. Wharmby. These proceedings were not taken under the Food and Drugs Act, which required that a sample should be left, and that the trader should be informed that the article was required for analysis, but these proceedings were under the Excise Act, and these acts were not required under the Act. However that might be, Mr. Wharmby had informed him since he was in court that he had himself analysed this sweet spirit of nitre, and was satisfied with the result of their analysis, so that there was not going to be any dispute about the facts. He thought from the letter which he should read that the defence would practically not be a defence at all, but a plea for mitigation of punishment. Mr. Squire then proceeded to read the letter, which repeated that the spirit was sold as purchased by Mr. Wharmby from Messrs. Bush, Son and Co, of London, for the usual market price, and as pure spirit, and he (Mr. Wharmby) had no knowledge to the contrary. On hearing of the matter, he at once wrote the wholesale firm, who replied that it was made from pure spirit of wine, and which they would guarantee. Mr. Squire said that whether the methylated spirit got in on Mr. Wharmby's premises, or was there when he purchased it, he could not say, and he did not know whether Mr. Wharmby would be able to prove it, but before the Bench listened to any appeal in mitigation of punishment, they ought to be satisfied that Mr. Wharmby did so obtain the spirit from Messrs. Bush, Son and Co., that it was sold by him in the same state as when he received it, and that nothing could by any possibility have happened to it while in his possession. If they were convinced, they had full power to mitigate the punishment to any sum they might think proper, though under the old law they were limited to one-fourth.

Mr. Whiskin, supervisor of Inland Revenue at Belper, said he conceived it to be his duty to make some inquiries with regard to medicines being sold in the district, and, as a result, he came to Mansfield on July 12 last, and purchased at Mr. Wharmby's a bottle of sweet spirit of nitre, a bottle of laudanum, and a bottle of paregoric.

Cross-examined: He did not tell what it was for.

Mr. C. H. Burge, analyst at the laboratory at Somerset House, said he received the sample produced on July 14, and examined it, finding it to contain methylated spirit. He also examined a sample of paregoric and four of laudanum, but did not find any methylated spirit in them.

That completed the case for the prosecution.

Mr. Hibbert said he was glad to be able to appear for Mr. Wharmby on that occasion, although of course sorry for the cause that gave rise to it. He believed Mr. Wharmby was well known to all, and was an old resident in the district. He had lived at Mansfield Woodhouse something like twenty-three years, and been assistant-overseer for that period, also holding the position of clerk to the Local Board for something like thirteen years. He believed in the eyes of all who knew him he had a most irreproachable character. The case was very fairly put before the Bench, and he wished to explain that his regret at no sample being left, was not because he thought the proceedings were under the Food and Drugs Act, but Mr. Wharmby might have had it analysed, and it might have materially altered the action he took at the time. It was rather hard on Mr. Wharmby, because he did not know, for the analysis taken since was from some procured elsewhere, and not from the bottle from which this was taken. He could not contradict the fact that some methylated spirit was contained in it, but his case for mitigation of the penalty was that while it was a very large penalty, it was nothing compared to the loss which Mr. Wharmby would sustain if the Bench marked their feeling by a heavy penalty, so as to imply, as it would, that he had some knowledge of it. Mr. Wharmby was not only a retail and wholesale chemist and druggist, but a large manufacturing chemist, and made a great number of articles, and he had been to great expense in this branch of the business. Mr. Hibbert drew attention to the fact that the other samples were found free from methylated spirit. He could not call Mr. and Mrs. Wharmby, but could call all the other inmates of the house to show that so far as Mr. Wharmby was concerned he purchased the sweet spirit of nitre of an eminent London firm, and paid the full price, naturally expecting to receive pure spirit, and it was guaranteed such in subsequent letters received from them. The sweet nitre was part of 36 gallons purchased in February, and Mr. Wharmby paid rather over the full market price. Mr. Wharmby kept no methylated spirit at all on his premises, although he did keep a preparation known in the trade as "finish," and used for polishing, but it was kept in a distinct part of the premises, and it was impossible for any of it to get in the sweet nitre, and the latter was certainly never tampered with either by accident or design, and he hoped the Bench would see their way, in that instance, not to bear very heavy on Mr. Wharmby, and not convict him in a large penalty, and let it go forth to the public, because he believed he was selling a pure article.

Mr. Hibbert said he should like to read a letter from Messrs. Bush, Son and Co.

Mr. Squire objected, unless it could be proved by Mr. Bush.

Mr. Hibbert said it was as to the guarantee, but he did not press the point.

Thos. Jennings said he was foreman for Mr. Wharmby, and attended generally to the business. He remembered some sweet nitre being obtained last February from Bush, Son and Co., and identified the price to be the full market one. It was kept in the third storey, and taken to the shop in small quantities for retail. It would be transferred at once into stoppered bottles, and one of these would be taken at a time for the supply of the shop. They did not use methylated spirit, but kept a preparation of it known as finish, and this was kept in the cellar, entirely distinct from the place where the sweet nitre was kept. It was impossible for it to have become contaminated, and to the best of his belief the sweet nitre was sold precisely in the condition it was received from Messrs. Bush.

Cross-examined: Sweet nitre was a very popular remedy for colds, patronized generally by working people. He recollected Mr. Whiston calling, and he supplied him from the shop bottle. He was sure the shop bottle formed part of the 36 gallons obtained from Messrs. Bush. They never reduced the specific gravity. They received it as 850. Since the complaints some of the nitre had been analysed, and he was satisfied that spirit was present. They had since had some more nitre from Messrs. Bush, and found it pure when tested. The same price was given for the second lot.

Walter Wharmby, son of defendant, said he was qualifying as a chemist, but understood how to analyse sweet nitre. He remembered some one coming last February, and corroborated the last witness as to all the circumstances. He tested the sweet nitre and found the second supply to be pure, but that received last February was not.

Cross-examined: They had not usually tested drugs received from the wholesale merchants, but had made arrangements to do so in future.

Samuel Shepherd, the apprentice, was called, but Mr. Hibbert said he did not want to labour the case if the Bench were satisfied with the evidence.

After private consultation of the magistrates Capt. Need said they had listened attentively and heard all the evidence given. They were satisfied that Mr. Wharmby did sell an impure article, and that was all they had to do with. Formerly they could only have reduced the penalty to a fourth of the maximum, and that would be their guide now, so that Mr. Wharmby would be mulcted in a penalty of £25.

Mr. Hibbert asked if the Bench would give a recommendation to the Board of Inland Revenue, who had power to mitigate the fine to any extent.

Capt. Need said they had considered the point and were not disposed to make any further recommendation.—*Nottinghamshire Free Press.*

Review.

THE CLINICAL CLERK'S GUIDE TO URINE TESTING.*

This is a little portable compendium of urine tests, arranged for carrying in the pocket. It includes the usual tests for most of the abnormal constituents likely to be found in urine, such as sugar, albumen, bile, blood, pus, mucus, uric acid, urates, phosphates, oxalates, cystin, tyrosin, etc. These tests are very briefly described, so as to be suitable for refreshing the memory rather than for obtaining an original knowledge of them, and are arranged under the heads of colour, deposit, sugar, etc., on a small folding card, so as to take up no more room than an ordinary letter. A caution is given that a precipitate may be given by nitric acid in the cold from the taking of copaiba or cubebs, but this must not be mistaken for albumen, and it dissolves on warming. The average normal quantities of urine and urea per diem are also given.

* London: H. Silverlock, 92, Blackfriars Road, S.E.

Obituary.

Notice has been received of the death of the following:—

On the 18th of October, Mr. John Stephen Harrington, Chemist and Druggist, Nichol's Square, Hackney Road, London. Aged 40 years.

On the 18th of October, Mr. George Kerman, Chemist and Druggist, York Street, Liverpool. Aged 79.

On the 25th of October, Mr. William Hughes, Chemist and Druggist, Presteign, Radnorshire. Aged 54.

On the 27th of October, Mr. Henry Samuel Stanton, Chemist and Druggist, Rock Ferry, Lancs. Aged 39.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

POISON REGULATIONS.

Sir,—When it was formerly proposed to institute regulations for the storage of poisons in pharmacies, I was one of those who actively opposed the proposition, and though I have adopted regulations for my own establishment, I should still oppose the legal enforcement of any regulations, unless it could be shown to be practicable to draw up such as would be useful and not inconvenient in the very varying circumstances of pharmacists in town and country.

The small number of cases of poisoning which occur through the want of such care and order in pharmacies, compared to those which arise from similar causes on the part of other dealers, hospitals, etc., shows that such regulations as are observed in pharmacies have a considerable value in promoting public safety, and I would willingly submit to some inconvenience for the sake of accentuating the advantage the public have in going for all dangerous articles to trained and educated men. But I would not willingly see the regulations which every sensible man must make for his own safety, and suited to his own circumstances, set aside for others which might be drawn up by amateur legislators or others imperfectly acquainted with the wants of any but a very small number of establishments. Personally I am not afraid of inspection. My experience of the Inland Revenue authorities, etc., in connection with patent medicine, methylated spirit, stills, etc., is that there is every disposition to be fair and gentlemanly towards those who deal fairly with them, and I know the experience of many alkali manufacturers regarding inspection under the Alkali Act is equally favourable. Dr. Angus Smith was willing and, through his experience, able to advise on methods of preventing escapes of noxious vapours, so a poison inspector of good pharmaceutical standing might be a protection to the public, and at the same time a boon to those of the trade who were willing to give him a friendly reception, and give and take hints regarding storage, with their neighbours. But the previous agitation of this poison question arose at a time when public panic made reasonable legislation difficult, and the advantage of opening the question now should be to promote legislation in a reasonable direction, based upon the evidence of the last twenty years.

The common sentiment of the former period was, "They should hang half-a-dozen of those chemists to teach them to be more careful." Without presuming to endorse this sentiment—which I am sure some at least of my fellow tradesmen will give me the credit of being willing to do—I may suggest that the case of those who seek the advantage of the pharmacist, should be that the

distribution of poisons by co-operative stores, hospitals and other unkickable corporations, should be "suspended" instead of the six chemists previously suggested for capital punishment.

As Dr. Symes has an appetite for good work, I should rejoice to see him collect evidence of the number of cases of poisoning which have occurred during the last twenty years, classifying them into those which have arisen through want of storage regulations, and sub-dividing these into such as happened through the want existing in pharmacists, and such as happened through the want existing in other establishments when the same materials are handled.

There are many other points, the elucidation of which would do much to promote sound judgment upon the question of poison legislation, but the above is the first consideration in view of regulating storage in pharmacies.

There is not much to be expected of suggested legislation, either in Parliament or at Bloomsbury Square, unless it is clearly for the purpose of removing some existing evil. Regulation by law of the storage of poisons in pharmacies does not as yet appear wanted for that purpose.

Newcastle. BARNARD PROCTOR.

EDUCATION AND EXAMINATION.

Sir,—A paper appears in this month's *Nineteenth Century*, under the title of "The Sacrifice of Education to Examination—a Protest," which contains some matter of interest to pharmacists, as justifying on the whole the course taken by the Society in the past, and also its recent demands upon Parliament. The "protest" itself is numerously and influentially signed, but the part which will be most read is the sequel, containing a sort of "symposium," by a triad of well-known writers, giving their individual views upon the subject. The first is by Max Müller, and from it I cull the following excerpts:—"Young men imagine that all their work has but one object—to enable them to pass examinations . . . . nothing is converted *in succum et sanguinem*. The only thing that seems to remain is an intellectual nausea—a dislike of the food swallowed under compulsion"; "our young examiners seem chiefly bent on finding out what candidates do not know" (this is spoken of the universities of England in opposition to those of Germany, but the words contain a lesson which all who are engaged in the work of examination may well lay to heart). "We now seem to have schools and universities simply and solely for the sake of examinations."

Then follows a highly characteristic paper from the pen of E. A. Freeman. It is chiefly concerned with the universities, but contains some withering sarcasms of general application on the use of "note-books" and "tips," to the exclusion of the study of the recognized text-books themselves.

By far the most interesting contribution, from a general point of view, is the last, by Professor Harrison. After some strictures upon the class of examiners, evidently of special application to those appointed by the universities, but nevertheless worthy of study and consideration by all, he says, "Examination papers, not text books, come to be the real subjects of study; the aim of the student is to get an insight into the mind of his examiner, not that of his teacher, and to master, not the subject of his study, but that artificial skill of passing examinations. Thereupon grew up another class of specialists, the crammers. Their business is, not to teach nor to test teaching; but to enable students to pass the tests. . . . So in the cricket field, having called in professional bowlers to practise, it became necessary to call in professional 'coaches' to teach the defence of the wicket. And in the result education is tending to become a highly exciting match between the 'bowlers' and the 'coaches.'"

"In sum, I complain that the trick of answering *printed questions* (italics mine) should now so largely take the place of solid knowledge. I do not deny that teachers may usefully examine their own students, as a help to their own teaching. I do not say there may not be one public and formal examination in any prolonged educational curriculum."

"The mischief of examination begins when it grows to be the be-all and end-all of its own sphere. The less the student be 'prepared' in the technical sense the better. The more free the examiner be to use his own discretion with each examinee, the more likely he is to judge him fairly."

Then follows an amusing allusion to the science examinations at the universities, in which the writer surmises that even a "famous man of science" could not "floor" off-hand one of the stock papers; he might "differ from the examining board as to the exact number of the isomeric amyl alcohols now known." "All this your trained examinee, well nursed by thorough crammers, has at the tips of his fingers." (Might not the writer have substituted "the latest views on the distribution in space of the constituent atoms of the benzene molecule" for his "isomeric amyl alcohols?")

"The student may be writing down mere 'tips' from memory; but if he makes no slip, and he has been carefully crammed, the examiner has to admit that he has got his marks."

"An examiner has rarely the chance of giving him as many quiet verbal questions from time to time as he might like." . . . . "There is absolutely no discretion."

"The candidates are often numbered and ticketed like prisoners, to avoid the disclosure even of names."

"For this state of things the remedies seem to be these:—Let examinations be more free; they are over-organized, over-regulated; give examiners more time, more discretion, more room; the more the teachers are themselves the examiners the better. Do not set examiners to test teachers as well as students." "Encourage [the student] to study for the sake of knowledge, for his own sake, for the public good."

I have endeavoured to select such passages as will stand without the context, and do not of course give my absolute adhesion to all of them; but they illustrate, I think, the wisdom of the system of our Society, which has avoided most of the pit-falls pointed out by the various writers, and vindicate the course we are taking in endeavouring to secure legislation which shall enable us to carry out more fully some of their suggestions.

W.

CHLORIDE OF AMMONIUM IN NEURALGIA.

Sir,—It is nearly twenty years since I first heard of chloride of ammonium being almost a certain cure for neuralgia. A medical man in the town in which I was an apprentice prescribed it in the form of powders.

℞ Ammon. Chlor. . . . . ℈j.

Capt. j 4tis. qq. horâ ex aquâ.

Dr. H's salt powders were constantly being dispensed; in fact, we generally kept them ready weighed.

I have since seen it given in the form of a mixture, with tinct. opii and sulphate of magnesia, and have seldom known it to fail. CHAS. A. JONES.

Sir,—In your issue of October 27 I observe one of your correspondents recommends the use of chloride of ammonium in cases of neuralgia. Unfortunately my experience of this complaint has been somewhat extensive, and I have found that, though the above drug acts occasionally as a remedy, a far more reliable cure is "phenacetin, Bayer," which, taken in doses of from 8 to 10 grains, has never yet failed to give prompt relief. I can heartily recommend a trial of this preparation, which I shall not be surprised to find universally used as a neuralgia specific.

London. A SUFFERER.

Erratum.—On p. 361, col. i., line 4, *for* "Iceland moss" *read* "Irish moss."

C. R. S. is advised to consult the "educational number" of one of the medical journals.

E. G. L. Wansborough.—Thanks for your note.

Major.—Apply to the Secretary of the Chemical Society, Burlington House, Piccadilly.

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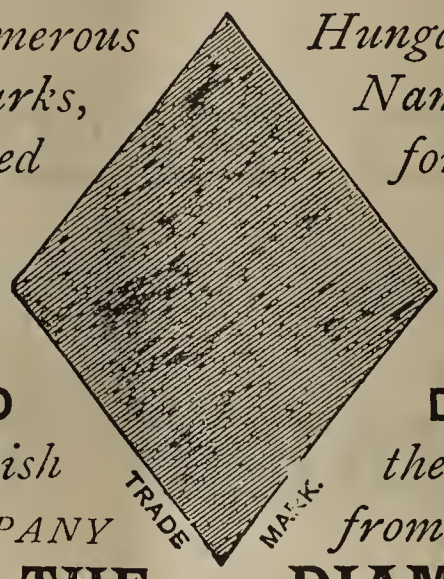

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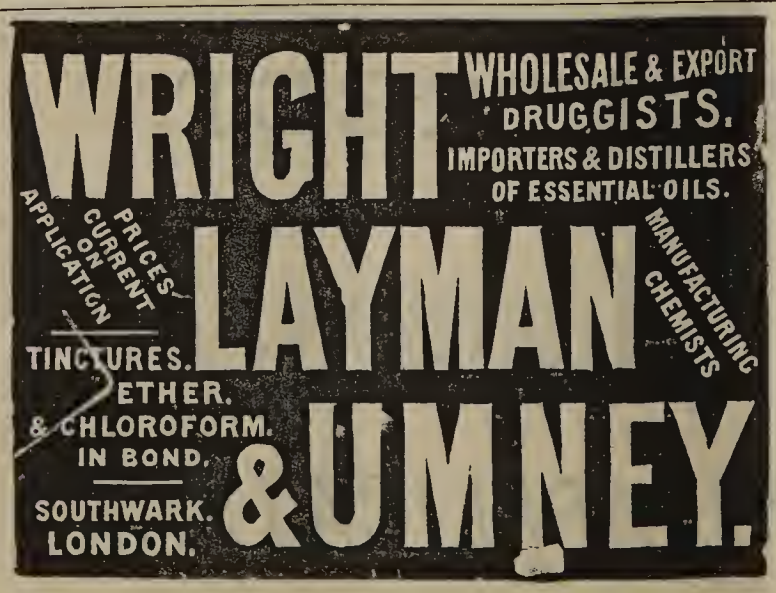

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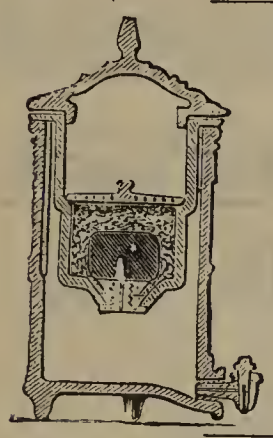

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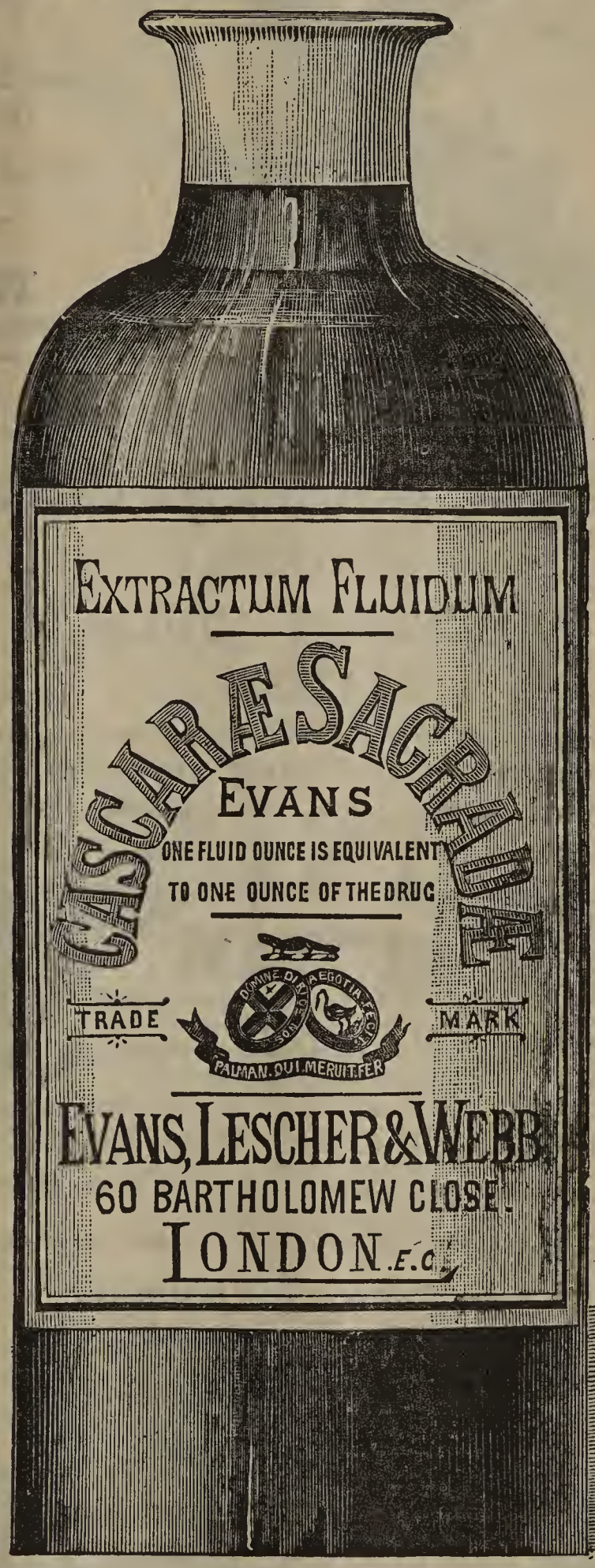

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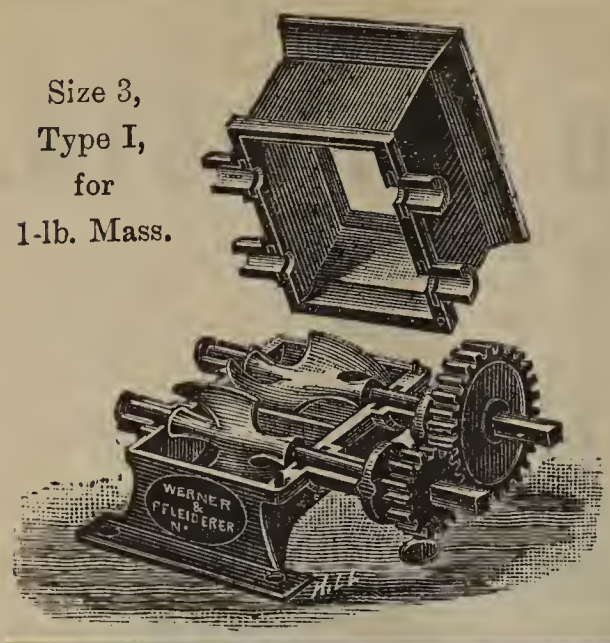

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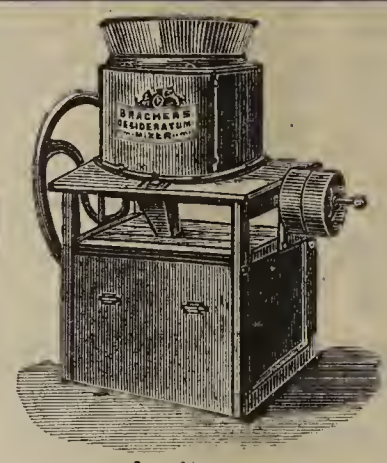

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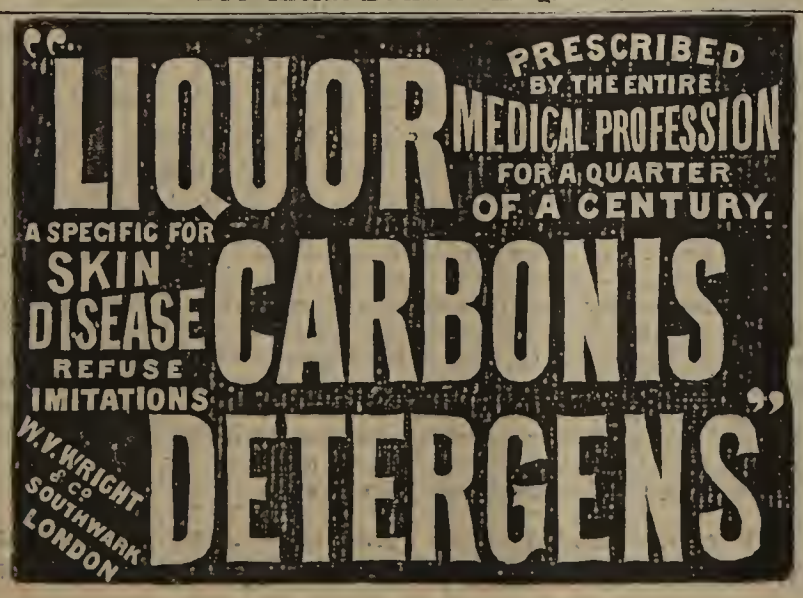

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SOUTHGATE Street, Gloucester.—BRUTON, KNOWLES & Co. are instructed by the Trustees of the will of the late Mr. T. J. Hunt, to sell by auction, at the Bell Hotel, Gloucester, on Wednesday, the 14th day of November, 1888, at 4 for 5 o'clock, the excellent Freehold Business Premises and DWELLING-HOUSE, known as No. 10, Southgate Street, most desirably situated in the centre of the city, comprising a double-fronted shop, with plate glass windows, drug room, dining, drawing, and breakfast rooms, 6 bed rooms, bath room, W.C., kitchen, and domestic offices, capital wine, beer, and coal cellars, with courtyard in the rear. The Premises, which occupy an important position for business purposes, are in perfect order, have a frontage to Southgate Street of 23 feet, and a side entrance.

The old-established BUSINESS of a Chemist and Druggist has been carried on for many years by the late proprietor, and the goodwill of the same, together with the superior modern fixtures, will be included in the sale.

For further particulars apply to Messrs. TAYNTON, SONS, & SIVETER, Clarence Chambers; or the Auctioneers, Albion Chambers, Gloucester.

Important to Chemists Fitting-up!

FOR Sale, a great bargain, the entire fittings of a Chemist's shop, including drawers, shelving, counters, show cases, dispensing screen (very handsome), carboys, window fittings, and also the stock. Must be cleared. Apply, R. TOMLINSON & SONS, Medical Fitters and Valuers, Bond St., Birmingham.

A RARE OPPORTUNITY.

THE advertiser is obliged to sell 30 fully-paid £5 shares in a first-class trading company paying good and regular dividends. Address, TRUSTEE, Box 52, Messrs. Deacon's, Leadenhall St., London.

CHEMISTS' TRANSFERS.

32, LUDGATE HILL, LONDON.

MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

VENDORS have the advantage of obtaining an opinion on Value, derived from extensive experience, and are in most cases enabled to avoid an infinity of trouble by making a selection from a list of applicants for purchase, with the view of submitting confidential particulars to those alone who are most likely to possess business qualifications and adequate means for investment.

PURCHASERS who desire early information regarding eligible opportunities for entering business will greatly facilitate their object by describing clearly the class of connection they wish to obtain.

N.B.—No Charge to Purchasers.

Messrs. ORRIDGE & CO. are instructed to transfer :—

1. £850.—LONDON, S.E. Dispensing and RETAIL of good class. Situate in main road. Established 16 years. Returns £850. Net profits above the average. Well fitted shop and good stock. Comfortable house, with good garden. About £800 required.
2. £700.—LONDON, N. Good class old-established BUSINESS. Held by vendor many years. Returns £700 yearly. Business capable of great extension. Handsome shop and good stock. Price about £700.
3. £3828.—WEST OF ENGLAND. Good agricultural centre. Very old-established Mixed BUSINESS. Returns average £3828, with good net profits. Good house, &c., attached. The business will bear the fullest investigation. Terms, small premium and valuation.
4. £700.—HOME COUNTY. Genuine unopposed country BUSINESS for immediate disposal (Mixed). Returns about £700 yearly. Good house, garden, fruit trees, &c. About £300 required.
5. £1448.—CORNWALL. Good town. Retail and Dispensing BUSINESS of good class, with Wine Agency attached. Returns about £1448 yearly. Large, well fitted shop and good stock. About £1000 required.
6. £2500.—MIDLANDS. Dispensing and RETAIL. Situate in the centre of a very favourite locality. Handsome double-fronted shop. Good house. Lease to be granted to incomer. Returns last year £2500. About £1500 required.
7. £800.—NORTH OF ENGLAND. Dispensing and RETAIL, with some Medicine Chest trade (very profitable). Returns last year over £800. Net profit over £300. Double-fronted shop and good stock. Good 10 roomed house (vendor's own). Lease to be granted. Price £600.

Personal applicants receive Messrs. O. & Co.'s direct attention and advice, where required, free.

VALUATIONS.

Terms for valuation on application.

Appointments by post or wire have immediate attention.

ORRIDGE & CO.

32, Ludgate Hill, E.C.

"THESE EXCELLENT PREPARATIONS."

Edinburgh Medical Journal, August, 1888.

"VALUABLE AND MOST SERVICEABLE. THEIR PURITY AND STRENGTH ARE UNQUESTIONABLE."

The Lancet, September 22, 1888.

"STRENGTH MOST ACCURATELY DETERMINED AND BROUGHT TO THE PHARMACOPŒIAL STANDARD."

Dublin Medical Journal, June, 1888.

"EQUAL TO THE FRESH PREPARATIONS, AND SUPERIOR TO THE ORDINARY ONE-TO-SEVEN INFUSIONS."

The British and Colonial Druggist, May 26, 1888.

Fletchers'

"THESE NEW LIQUORS HAVE HIGHER CLAIMS THAN FOR THEIR MERE CONVENIENCE; THEIR POTENCY IS UNQUESTIONABLE, AND THEY PROVIDE THE ELEMENT OF CONSTANCY WHERE THAT CAN GENERALLY NOT BE ASCERTAINED, OR EVEN OBTAINED, BY THE ORDINARY METHODS."

The Chemist and Druggist, December 3, 1887.

Concentrated Liquors

"A DISTINCT NOVELTY . . MANIFESTLY VERY CONVENIENT. We have compared Tinctures, &c., made from these Concentrated Liquors, with similar preparations made exactly according to the B.P. methods, and we find that they are practically identical in character."—*British Medical Journal*, July 7th, 1888.

"SUBJECTED TO A PROLONGED TEST in the dispensing-room of a hospital. The resulting Tinctures are INDISTINGUISHABLE IN STRENGTH, APPEARANCE AND EFFICACY FROM THE OFFICIAL PREPARATIONS. Their strength is constant and easily ascertainable, and they keep well. WE CAN CONSCIENTIOUSLY RECOMMEND THEM."—*The Practitioner*, November, 1888.

Fletcher, Fletcher & Stevenson,

North London Chemical Works, Holloway, London, N.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 960.] SATURDAY, NOVEMBER 17, 1888. [PRICE FOURPENCE.

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PHARMACY ACT, 1868.

IMPORTANT NOTICE.

The REGISTRAR *appointed for the purposes of this Act has exercised the powers given by Statute for the purpose of enabling him to keep a correct Register, and in so doing has, at intervals of six months, sent notices by registered letters to the persons, and at the addresses appearing in the list at page* 392.

The clause in the Statute under which the notices have been sent is the following:—

"*It shall be the duty of the* REGISTRAR *to make "and keep a correct Register, in accordance with "the provisions of this Act, of all persons who "shall be entitled to be registered under this Act, "and to erase the names of all registered persons "who shall have died, and from time to time to "make the necessary alterations in the addresses "of the persons registered under this Act; to "enable the* REGISTRAR *duly to fulfil the duties "imposed upon him, it shall be lawful for the "*REGISTRAR *to write a letter to any registered "person, addressed to him according to his address "on the Register, to inquire whether he has ceased "to carry on business, or has changed his residence, "such letter to be forwarded by post as a registered "letter, according to the Post Office Regulations "for the time being, and if no answer be returned "to such letter within the period of six months "from the sending of the letter, a second, of similar "purport, shall be sent in like manner, and if no "answer be given thereto, within three months of "the date thereof, it shall be lawful to erase the "name of such person from the Register; provided "always that the same may be restored by direc-"tion of the* COUNCIL OF THE PHARMACEUTICAL "SOCIETY, *should they think fit to make an order "to that effect."*

In no instance has the REGISTRAR *received any reply, and in nearly every instance the letters have been returned through the Dead Letter Office.*

The names of all the persons appearing in the list will be erased from the Register on December 31*st next, unless the registered persons communicate with the* REGISTRAR.

The attention of LOCAL SECRETARIES *is especially directed to this notice, as they may, by timely intimations to any of the registered persons known to them, render to those persons important service.*

RICHARD BREMRIDGE,
Registrar.

Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

36, York Place, Edinburgh.

An Evening Meeting of the Society will be held in the Society's House, 36, York Place, Edinburgh, on Wednesday next, November 21st, at 8.30.

Mr. William Gilmour, F.R.S.E., in the chair.

PROCEEDINGS.

"Inaugural Address," by the Chairman.

"Donations to the Museum."

EVENING MEETING.

17, Bloomsbury Square, London.

An Evening Meeting of the Society will be held at the Society's House, 17, Bloomsbury Square, London, on Wednesday, December 12th, at half-past Seven.

The chair will be taken at Eight *precisely*.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at 7, and the Curator of the Museum will be in attendance to give any information or explanation with regard to the objects exhibited that may be required.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, December 5th, as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

PRELIMINARY EXAMINATION.

This Examination will be held throughout Great Britain, at 11 a.m., on the second Tuesday in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society, of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the Election of Three Annuitants on the Benevolent Fund of this Society will take place on Thursday, the 6th day of December next, at 12 o'clock precisely.

RICHARD BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 3rd, 1888.

For List of Approved Candidates, see Journal, October 20, page ii.

There are at present *forty-nine* annuitants, receiving £1670 per annum, and casual relief is also granted, amounting in 1887 to nearly £500. The total expenditure in 1887 was £2375.

The following is the scale of pensions :—

£30 per annum to pensioners under 65 years of age, and £35 per annum to pensioners 65 years of age, and upwards.

ABSTRACT OF RULES IN REFERENCE TO VOTES AT THE ELECTIONS OF ANNUITANTS.

Annual Subscribers of

Half-a-crown are entitled at each election of Annuitants to	ONE Vote.
Five Shillings	TWO Votes
Half-a-guinea	FIVE Votes
One Guinea	TEN Votes.

And to increase in the same proportion.

Five Guineas are entitled to	FIVE Votes for life.
Ten Guineas..	TEN Votes for life.

And to increase in the same proportion.

Donations and Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to Richard Bremridge.

LIBRARY.

The following books are missing from the Library in London:—

Annalen der Chemie, Bd. 117-20, 213-16.
Art of Dispensing, 1885.
Attfield, Chemistry, 9th ed., 1881.
Attfield, Water and Water Supplies, 1884.
Beasley, Druggists' Receipt Book, 7th ed.; 8th ed.
Bell, Analysis of Food, vol. 2, 1883.
Bentley, Structural Botany, 1883.
Bentley, Materia Medica, 1887.
British Pharmacopœia, 1885.
Davies, Microscopic Mounting, 1881.
Fownes, Chemistry, Actonian Prize Essay, 1844.
French Codex, 1866.
Goodeve, Principles of Mechanics, 2nd ed., 1876.
Hardwich, Manual of Photographic Chemistry, 9th ed.
Martindale and Westcott, Extra Pharmacopœia, 2nd ed., 1884; 3rd ed., 1884.
Muter, Organic Materia Medica, 2nd ed., 1878.
Pereira, Selecta è Præscriptis, 17th ed., 1881.
Pharmaceutical Register, 1881, 1886.
Ramsay, Chemical Theory, 1884.
Remsen, Theoretical Chemistry, 2nd ed., 1884.
Reynolds, Experimental Chemistry, part 2.
Roscoe, Elementary Chemistry, 1873.
Stewart & Gee, Practical Physics, vol. 1.
Thorowgood, Materia Medica, 1st ed., 1874.
Wanklyn, Tea, Coffee and Cocoa, 1874.
Wills, Practical Botany.
— Vegetable Materia Medica, 6th ed., 1883.
Woodward, Arithmetical Chemistry, parts 1–2.

Members, Associates, and Apprentices are invited to examine their Libraries, and if any of the above-mentioned works be found therein, to forward such work or works to the Librarian of the Society.

THE PHARMACEUTICAL JOURNAL

Guaranteed Circulation of 7000 Copies Weekly.

(The LARGEST Issue of any Journal addressing Chemists and Druggists.)

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ASSISTANTS SEEKING ENGAGEMENTS *only* ... } Twelve words not exceeding two lines, or less, 1s.; each additional six words, or less, 6d.

*** *In these Advertisements, Two Initials or Two Figures count as one word.*

Advertisers are requested to observe :—

1.—That Advertisements are received by the Publishers not later than Ten o'clock on Thursday morning, and they must be prepaid.

2.—That letters addressed to initials or to fictitious names at a Post Office are not delivered by the Post Office Authorities, but are at once sent back by them to the writers.

3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM. JOURN.**" and must be sent only to J. & A. CHURCHILL, 11, New Burlington Street, London, W.
Telegraphic Address, "Churchill, Publishers, London."

N.B.—The Journal is supplied from the publishing office post free to any part of the United Kingdom on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad (excepting India and China), 22*s.*; India and China, *viâ* Brindisi, 24*s.* per annum.

Payment may be made either by **Cash** in a Registered Letter, by **Postal Order**, by **Cheque** crossed London and County Bank, or by **Money Order**, payable at Regent Street, W., to J. & A. CHURCHILL. *Postage Stamps for any amount above Ninepence cannot be received in payment.*

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NON-POISONOUS, PLEASANT and BEST. Gold Medals—Calcutta, 1883-84; Paris, 1885; Antwerp, 1886.

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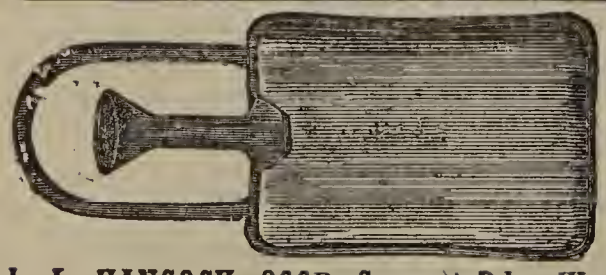

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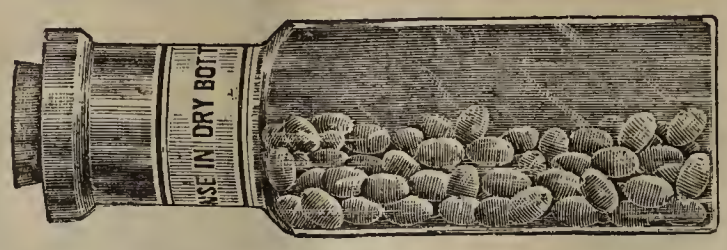
EXACT  SIZE.

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FOR SHIELDING THE LUNGS.

Fig. 3.
Double, for the Chest and Back.

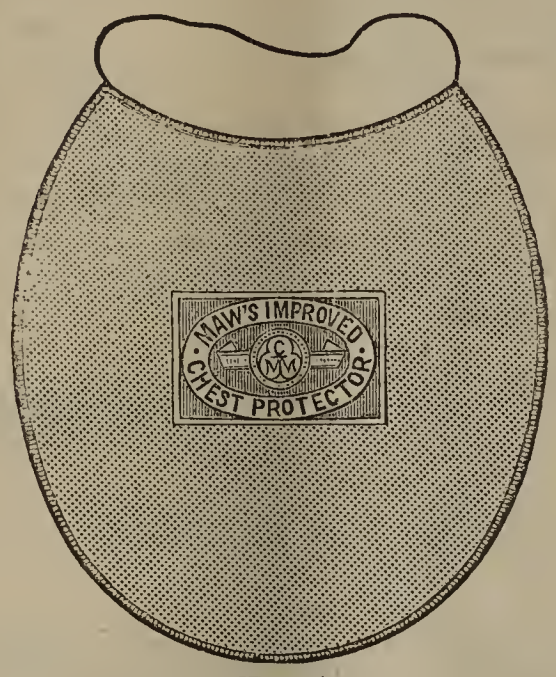

Fig. 4.
Single, Chest Protector.

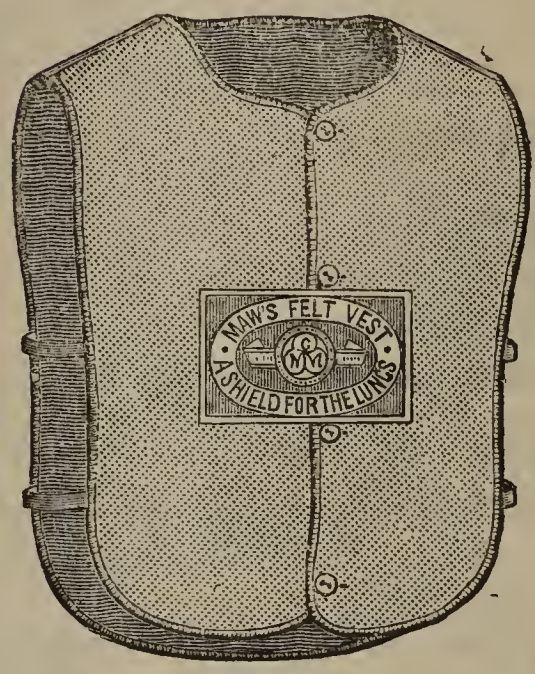

Fig. 5.
Vest, a Shield for the Lungs.

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		No. 1.	No. 2.	No. 3.	No. 4
Fig. 3. Double	per doz.	20/	26/	32/	39/
Ditto, perforated	„	24/	32/	38/	46/
Fig. 4. Single	„	9/	11/6	13/6	16/
Ditto, perforated	„	11/	14/	16/	19/
Fig. 5. Vests „	„	27/	34/	42/	51/

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Fig. 3. Double, best, per doz.	17/	22/	27/	33/	44/
Ditto, second „	14/6	19/	23/	28/	37/
Fig. 4. Single, best „	7/6	9/6	11/	14/	20/
Ditto, second „	6/6	8/	9/6	12/	16/
Fig. 5. Vests, Scarlet „	17/	22/	27/	33/	40/

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Alet	10/	..	50	38/	..	..	Mont Dore	10/	..	50	40/	..	..
Apollinaris	6/3	5/	50	25/	100	39/	**Oberbrunnen**	**10/**	..	**50**	**40/**	..	..
Birmensdorf	12/	..	50	48/	..	..	**Orezza**	**12/**	..	**30**	**28/**	..	..
Bonnes	12/	10/	50	48/	50	40/	**Pullna**	**12/**	**8/**	**40**	**36/**	**40**	**25/**
Bourboule (La)	**11/**	..	**50**	**42/**	..	..	Roisdorf	6/	..	50	25/	..	..
Bussang	7/	..	50	28/	..	..	**Rosbach**	**6/**	**5/**	**50**	**24/**	**100**	**36/**
Carlsbad	**10/**	..	**50**	**40/**	..	..	**Royat**	**9/**	..	**50**	**34/**	..	..
Condal	..	14/	..	..	50	56/	**Rubinat**	**15/**	..	**25**	**30/**	—	..
Contrexeville "Le Cler"	**8/**	..	**50**	**32/**	..	..	St. Boës	12/	..	50	48/	..	..
Do. "Pavilion" ..	9/	..	50	35/	..	..	**St. Galmier** Badoit (Still) ..	**6/**	..	**50**	**22/**	..	..
Ems	7/	..	50	28/	..	..	Do. Noël (Sparkling)	6/	4/	60	26/	100	34/
Flitwick	12/	..	..	..	..	..	St. Moritz	12/	..	50	48/	..	..
Friedrichshall	13/	10/	25	25/	50	40/	Salvator	..	9/	..	..	50	36/
Glesshubler, double-size bottles	**11/**	..	**25**	**21/**	..	..	Schwalbach	8/	6/	50	30/	50	24/
Do. claret-shape ,,	8/	5/	50	29/	100	36/	**Selters**	**6/**	**4/**	**50**	**23/**	**50**	**16/**
Homburg	10/	..	50	38/	..	..	Sulis	6/	5/	50	23/	100	36/
Hunyadi-Janos	15/	13/	25	30/	50	50/	Tarasp	12/	..	30	28/	..	..
Johannis-Brunnen	6/	5/	50	23/	100	36/	Taunus	5/6	4/6	50	22/	100	32/
Kissengen	11/	..	50	45/	..	..	**Vals** (Société Springs)	**8/6**	..	**50**	**32/**	..	..
Kreuznach	11/	..	50	45/	..	..	**Vichy** (State Springs)	**8/6**	**7/6**	**50**	**32/**	**50**	**28/**
Kronenquelle	**10/**	..	**50**	**40/**	..	..	**Victoria Ofner**	**14/**	**10/**	**25**	**27/**	**50**	**38/**
Marienbad	10/	..	50	38/	..	..	Wildungen	10/	..	50	40/	..	—

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Copaiba, with or without Name, best, in oval boxes	,,	5/9	Do.	do.	6/6	—	9/-
Copaiba, Flexible, in oval boxes	,,	6/-	Do.	do.	6/9	—	9/6
Copaiba, Flexible, larger, in oval boxes ...	,,	8/-	Do.	do.	—	10/-	—
Copaiba and Cubeb, in square boxes ...	,,	9/-	Do.	do.	—	11/-	—
Copaiba, Cubeb, and Buchu, in oval boxes ...	,,	8/-	Do.	do.	—	10/-	—
Copaiba, Cubeb, and Sandal-wood Oil, Flexible, in oval boxes.	,,	17/-	Do.	do.	17/-	—	25/
Oil of Male Fern (18 drops), in square boxes	,,	17/-	Do.	do.	—	18/-	—
Sandal-wood Oil, Flexible, English, in round boxes	,,	26/-	Do.	do.	—	30/-	—
Sandal-wood Oil, Flexible, Foreign, in round boxes	,,	20/-	Do.	do.	—	23/-	—
Tar, Norwegian, in square boxes	,,	6/-	Do.	do.	—	7/-	—
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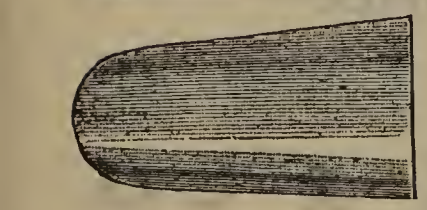

Fig. 5.

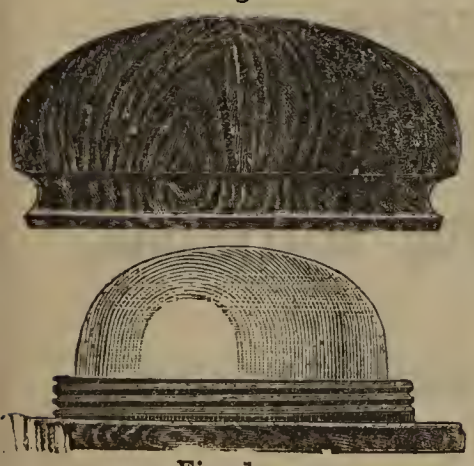

Fig. 1.

Fig. 3.

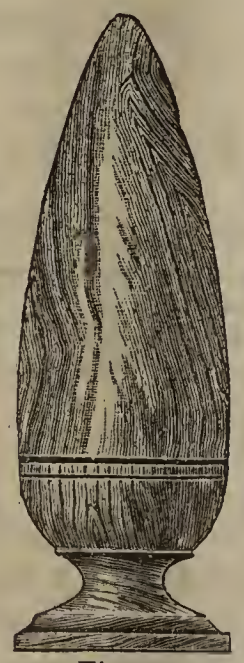

Fig. 4.

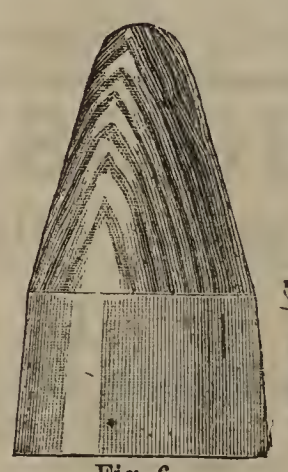

Fig 6.

Fig. 7.

Fig. 8.

Fig. 1.	In Ebony Cases, flat for the pocket	per doz. 6/-
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Fig. 6.	Mounted on Vegetable Ivory, in Glass Bottles, Screw Metal Caps	,, 4/6
Fig. 7.	On Boxwood Mounts, Glass Covers	,, 3/6 and 5/9
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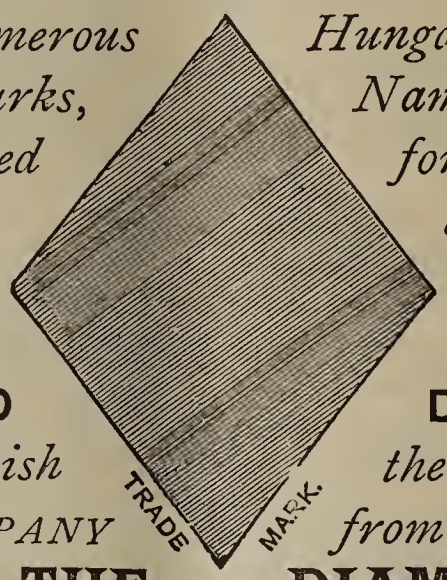

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I seem to have no end of novelties to tell you of to-day, and the last one is some new soap which hails from America, and is a most excellent article and pleasant to use, for I have got some. It is called Cashmere Bouquet, and is the invention of Messrs. Colgate & Co. The manufactory is 55, John Street, New York, but you can easily get it here.

From the "Star."

The other day, passing through Paris, I found as usual I had come without any soap. At an English chemist's I was offered, and accepted, a soap that was quite new to me—Colgate's. It is an exquisite soap, creamy, smooth, and with a ready lather. It leaves a beautiful feeling on the skin. After using it I felt for a while as if my complexion were as fresh and as smooth as a baby's. I don't know whether it has yet got into the shops. It ought to be popular. It is certainly a beautiful soap. A lady tells me it is especially good in London, as it softens the hard water. A friend of hers who went frequently to America had always to bring a packet back. Since she discovered she can get it here, she has been able to spare him this trouble.

From the "Court Circular."

It is somewhat remarkable that out of the two or three hundred exhibits at South Kensington no less than eleven stands are devoted to perfumery, and it is also noteworthy that, although some of the best English perfumers are here represented, it is to an American firm that the palm must be accorded, viz., Messrs. Colgate & Co., of New York, whose particular specialities are their Cashmere Bouquet and Cashmere Bouquet Toilet Soap, both of which are so refreshingly sweet, and so unlike any other perfumery we have come across, that of themselves they are sufficient to make the fortune of any firm of perfumers. The firm are said to be the largest and oldest toilet soap makers and perfumers in America, having received no less than thirty awards, and if the other preparations at all approach their Cashmere Bouquet, they well deserve all the honours they have obtained. The exhibits themselves form a highly artistic arrangement. Our opinion is that Cashmere Bouquet is positively unequalled.

From the "London Medical Recorder."

Colgate & Co.'s Cashmere Bouquet Toilet Soap.—This is a high-class toilet soap of a pale straw colour, highly fragrant, manufactured by Messrs. Colgate, extensive manufacturing perfumers, of New York. The firm make no less than 103 different kinds of soap, but the Cashmere Bouquet has obtained so much favour that, we are informed, the quantity sold last year exceeded that of all other fancy soaps imported into the United States. Messrs. Colgate & Co. have been lately awarded a Gold Medal at the Ostend Sanitary Exhibition for their Cashmere Bouquet Soap and Perfume.

Colgate's Cashmere Bouquet Soap, price retail 1s. 3d., per doz. 10s., per gross 110s. net. Colgate's Cashmere Bouquet Perfume, price 1 oz., 2s. 6d. retail, 22s. per doz., 255s. per gross; 2 oz., 4s. retail 30s. 9d. per doz., 355s. per gross, of all Wholesale Druggists.

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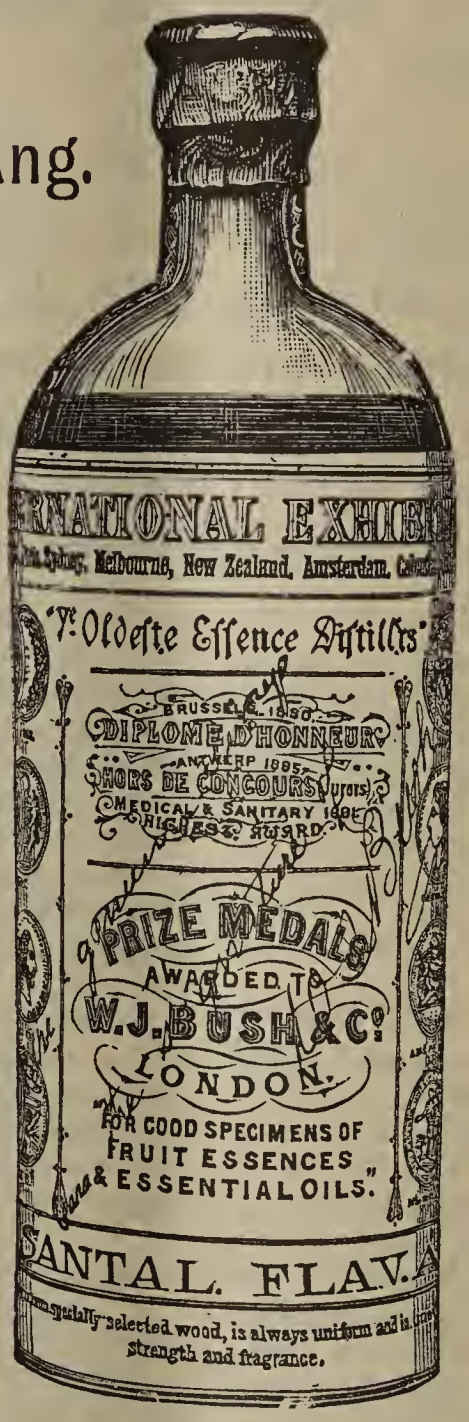

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CHEMICAL OBSERVATIONS ON TARTAR EMETIC.*

BY PROFESSOR DUNSTAN AND MISS L. E. BOOLE.

[*Communication from the Research Laboratory of the Pharmaceutical Society.*]

1. On some Statements in the British Pharmacopœia.

For the determination of the antimony in tartar emetic the pharmacist may be supposed to rely on the process described in the British Pharmacopœia. "Twenty-nine grains dissolves (*sic*) slowly but without residue in a fluid ounce of distilled water at 60° F. (15·5° C.), and the solution gives with sulphuretted hydrogen an orange precipitate which when washed and dried at 212° F. (100° C.) weighs 15·1 grains."

These instructions stand in need of considerable amendment to render them of any service in practice. Unless the solution is first acidified, oxy-salt is invariably carried down with the sulphide, and this together with free sulphur, will cause the result to be higher than that which is demanded by the known composition of the salt. Acid tartrate of potassium is also precipitated, and it is difficult to remove the whole of this salt from the precipitate unless it is washed with an unusually large quantity of water. Further, it is extremely difficult to filter the finely divided sulphide, in fact, it is almost impossible to do so, unless the liquid containing the precipitate is boiled for some time ; but this generally leads, when free acid is present, to the decomposition of some of the sulphide, and in this way error is introduced. Again, antimony sulphide cannot be completely dried at 100° C. A small quantity of water, about two per cent., is obstinately retained, and is only lost with difficulty at a higher temperature ; indeed, according to Fresenius, even at a higher temperature a current of carbon dioxide is necessary to effect its entire expulsion. It is chiefly for these reasons that chemists in general have long since abandoned the method of directly weighing the antimony sulphide, and yet the process is adopted, as a test of purity, in the British Pharmacopœia without any allusion to these various sources of inaccuracy. Lastly, it should be observed that the amount of antimony sulphide represented by the Pharmacopœia as obtainable from 29 grains of tartar emetic is 15·1 grains, whereas the quantity demanded by the formula of the salt ($SbOKC_4H_4O_6,\frac{1}{2}H_2O$) is only 14·67 grains.

2. The Volumetric Estimation of the Antimony in Tartar Emetic.

Having regard to the extensive employment of tartar emetic in medicine, it is clearly desirable that a trustworthy and simple method for its quantitative analysis should be available for use by the pharmacist. A volumetric process has been proposed which involves the use of standard solutions of bleaching powder and potassium arsenite. For the pharmacist this process is inconvenient, since it necessitates the employment of two volumetric solutions which must be specially prepared.

It seemed worth while to attempt to utilize, for a volumetric process, the decolorization of a solution of iodine, which is effected by a solution of tartar emetic, on the basis of the reaction

$$SbOK{\cdot}C_4H_4O_6 + I_2 + 2H_2O = 2HI + KHC_4H_4O_6 + HSbO_3.$$

Mohr had already proposed to utilize this oxidation as a volumetric operation applicable to antimonious compounds, and on his recommendation the process is not infrequently described in treatises on volumetric analysis. The method has been tested by Fresenius, whose results were not quite satisfactory, being in general slightly too high. It appeared desirable that a further trial of the method should be made.

Tartar emetic was several times crystallized from water, and the crystals dried by exposure in a partial vacuum. To establish the purity of these crystals the amount of potassium was determined. As this proved to be a troublesome operation, it may be well to give some account of the different experiments which were made, as well as of the method finally adopted. In order to separate the potassium it was necessary first to remove the whole of the antimony from a solution of the salt. Many attempts were made to effect this removal by means of hydrogen sulphide, but these failed, chiefly for reasons which have already been alluded to. Neither was it found practicable to remove the antimony by the evaporation of a solution acidified with hydrochloric acid, since a small quantity of antimony was dissolved when the residue, left on ignition, was boiled with water. Simple ignition of the salt and extraction of the mass with water failed for the same reason. The plan which answered best was to precipitate a solution of the salt with ammonia, which effected the removal of nearly the whole of the antimony as antimonious hydrate, a small quantity being subsequently separated during the evaporation of the ammoniacal filtrate. Since ammonium and potassium tartrates remain dissolved it is necessary before the potassium can be estimated to ignite the residue left after evaporation. This is accomplished at a low red heat, and the carbonaceous mass is boiled and washed with water, and the potassium finally precipitated as platinochloride in the usual manner, or more simply, the solution may be titrated with an acid solution of known strength. Working in this way, 1·7408 gram of tartar emetic yielded an ash containing 0·3615 gram of potassium carbonate ; the quantity of potassium carbonate calculated from the formula $SbOKC_4H_4O_6,\frac{1}{2}H_2O$ is 0·3617 gram. Having thus established the correspondence of the crystals with the formula ($SbOKC_4H_4O_6,\frac{1}{2}H_2O$) they were used in the subsequent experiments. Trials were first made with solutions of tartar emetic acidified with hydrochloric acid, which were titrated with a decinormal solution of iodine, using starch as an indicator. The quantity of hydrochloric acid added was, in each experiment, exactly sufficient to form potassium chloride from the tartar emetic. The dilution of the solution was varied, but without appreciably affecting the results. Although some of the experimental data recorded below agree fairly well with the calculated numbers, yet the method cannot be trusted, on account of the absence of any sharp termination of the reaction, which lags increasingly with each addition of iodine. This difficulty sufficiently explains the discrepancies in the results, which are here recorded :—

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, November 14.

Tartar emetic taken.	Dilution of the liquid.	Tartar emetic found.
0·10	40	0·098
0·10	60	0·097
0·10	80	0·099
0·20	160	0·195
0·20	100	0·195.

Experiments were next made with solutions of tartar emetic to which sodium bicarbonate had recently been added. When this salt is dissolved in a solution of tartar emetic no visible change is observed at first, but after the lapse of a few minutes the liquid becomes turbid, and gradually nearly the whole of the antimony falls as a white precipitate of antimonious hydrate

$$NaHCO_3 + Sb.OK.C_4H_4O_6 + H_2O = KNaC_4H_4O_6 + Sb(OH)_3 + CO_2.$$

If a solution of iodine is added to the liquid before the precipitation has commenced it is immediately decolorized, and a sharp termination of the reaction is observed. If, however, the solution of iodine is not added until precipitation has commenced, then wholly incorrect results will be obtained, since the precipitated hydrate is hardly attacked by the iodine. To illustrate the importance of accomplishing the reaction before precipitation has set in, an experiment may be quoted in which two solutions of tartar emetic containing precisely the same quantity of the salt were mixed with an equal quantity of sodium bicarbonate. In the one solution, titration with iodine was immediately performed, when it was found that 18 cubic centimetres of the decinormal solution of iodine were consumed. In the other solution titration was not commenced until after the lapse of some hours, by which time nearly the whole of the antimony had been precipitated. The mixture was now found to require less than half a cubic centimetre of the solution of iodine to complete the oxidation of the small quantity of antimony compound which had not been precipitated. For this reason, a solution of sodium bicarbonate should be added to the dissolved tartar emetic immediately before the titration is conducted. In the experiments recorded below from 10-20 cubic centimetres of a five per cent. solution of sodium bicarbonate were employed, and the dilution of the solution was varied. We have not found a large quantity, either of sodium bicarbonate or of water, to affect the chemical change to any appreciable extent. In practice, it will be found that 0·2–0·3 gram of tartar emetic is a convenient quantity to take for each estimation.

Tartar emetic taken.	Dilution.	Tartar emetic found.
0·1 gram	80 c.c.	0·100
0·1 ,,	100 ,,	0·100
0·2 ,,	20 ,,	0·200
0·2 ,,	100 ,,	0·200
0·4937 ,,	100 ,,	0·4926
0·5472 ,,	100 ,,	0·5465.

These results conclusively prove that the reaction occurring between solutions of tartar emetic and iodine in the presence of sodium bicarbonate is quite definite, and may be utilized as the basis of a volumetric operation in which solutions of tartar emetic, with sodium bicarbonate, are titrated with a decinormal solution of iodine in the usual manner.

3. Action of Alcohol on an Aqueous Solution of Tartar Emetic.

When alcohol is added to an aqueous solution of tartar emetic a white precipitate is produced. This has been alleged to consist either of finely divided hydrous crystals or perhaps of the anhydrous salt. The use of anhydrous salt in quantitative experiments such as we have conducted is of much assistance, since the hydrous crystals are liable to alter their composition, owing to efflorescence. We therefore investigated the composition of this precipitate after it had been quickly dried, first at 50° C., and finally in a partial vacuum, over calcium chloride. The white powder was dissolved in water and the liquid was titrated with a solution of iodine. The results obtained were as follows:—

Weight of salt taken.	Weight of salt found, calculated as $SbOKC_4H_4O_6$.
0·1656	0·1657
0·4960	0·4957.

They prove that the precipitate, prepared as above described, is entirely constituted of anhydrous tartar emetic.

3. The Specific Rotation of Aqueous Solutions.

The action of aqueous solutions of tartar emetic on polarized light is very rarely alluded to in treatises on chemistry. Solutions of the salt are powerfully dextro-rotatory. Determinations of the specific rotation have been made by Landolt and by Krecke. Landolt found that 7·982 of anhydrous tartar emetic dissolved in 100 c.c. of water effected at 20° C. an amount of rotation equivalent to $[\alpha]_D = +142{\cdot}76°$. Krecke found that a five per cent. solution of tartar emetic at 25° C. effected a rotation corresponding to $[\alpha]_D = +138{\cdot}66°$. We have made several determinations at 15° C. with a four per cent. solution of the crystallized salt, using a tube 200 mm. long. The angle of rotation under these conditions is +11·3°, whence $[\alpha]_D = +141{\cdot}25°$, and for the anhydrous salt under the same conditions +11·4, whence $[\alpha]_D = +142{\cdot}5°$. This result is probably in agreement with that obtained by Krecke at 25° C., since it is known that an increase of temperature causes a decrease in the specific rotation of this compound.

It is a remarkable fact that a solution of tartar emetic possesses a much greater specific rotation than a corresponding solution of any of the commonly-occurring tartrates. For acid tartrate of potassium, for instance, $[\alpha]_D = +22{\cdot}61$. The high specific rotation is therefore characteristic of tartar emetic, and might be usefully employed as a test for the purity of the salt. Thus we have found that an admixture of five per cent. of acid tartrate of potassium with tartar emetic reduces the rotatory power of a 4 per cent. solution of the salt to +10·6° (200 mm. at 15° C.) that is for $[\alpha]_D$ +132·5°.

By means of its action on polarized light a solution of tartar emetic may readily be distinguished from any of the double oxalates of antimony and potassium, which are used in dyeing as substitutes for tartar emetic, since solutions of these salts are devoid of action on polarized light.

4. An Examination of Commercial Specimens.

It seemed to be of interest to determine the purity of the tartar emetic employed in medicine. Twelve specimens were purchased from pharmacists. The antimony was estimated by titration of the dissolved salt with a standard solution of iodine in the manner previously described. The results were as follows:—

Analyses of Commercial Specimens of Tartar Emetic.

No. of specimens.	Weight of salt taken.	Weight of salt found.	Percentage of ($SbOKC_4H_4O_6\frac{1}{2}H_2O$).
1. . .	0·236	0·2415	102·3
2. . .	0·3515	0·3554	101·1
3. . .	0·2584	0·2608	100·9
4. . .	0·2218	0·2221	100·1
5. . .	0·2511	0·2491	99·2
6. . .	0·2649	0·2633	99·4
7. . .	0·3373	0·3336	98·7
8. . .	0·2602	0·2562	98·4
9. . .	0·2894	0·2825	97·6
10. . .	0·2305	0·2235	96·9
11. . .	0·2539	0·2426	95·5
12. . .	0·2434	0·2305	94·7

It will be seen that many of these specimens are of such purity as one might reasonably look for in commerce. It is noticeable, however, that several specimens have yielded more antimony than is obtainable from a salt of the formula ($SbOKC_4H_4O_6,\frac{1}{2}H_2O$). We have investigated the cause of this anomaly and find it to be due to the absence from the salt of the proportion of water indicated by the usual formula, loss having occurred from the efflorescence of the crystals, which readily takes place when they are kept in air. That this is the cause of the discrepancy was proved by estimating the water in a specimen which had afforded an anomalous result. The specimen selected for this purpose was that numbered 1 in the foregoing table, which contained an amount of antimony corresponding to 102·3 of crystallized tartar emetic. This salt, on being dried between 100°–110°, lost only 0·52 per cent. of water, instead of 2·72 per cent., and by calculating, on this basis, the percentage of crystallized tartar emetic, it is found to be 102·2 per cent., a result which agrees with that obtained by the direct determination of the antimony. The occurrence of efflorescence to a greater or less extent therefore explains these high results.

A few specimens afforded results rather below the average, notably the specimen numbered 12 in the table. None of these specimens dissolved completely in the necessary quantity of cold water. Two grams of the specimen numbered 12 in the table were warmed to about 50° C. with 34 c.c. of water. This liquid when cooled to 15° C. and maintained for some hours at that temperature yielded crystals which were recognized as acid tartrate of potassium. The potassium in the salt was also estimated and found to be higher than that required by the formula ($SbOKC_4H_4O_6,\frac{1}{2}H_2O$). The rotatory power of a 4 per cent. solution was determined at 15° C. in a tube 200 mm. long. The angle of rotation was +10·5°, whence $[\alpha]_D = 131·25°$, a result which approximately agrees with that which had been previously obtained with a solution of tartar emetic known to contain 5 per cent. of acid tartrate of potassium. It was thus proved that the specimen contained about five per cent. of acid tartrate of potassium. This specimen, which was in fine powder, had also probably suffered efflorescence, but we had not a sufficient quantity to determine whether this was the case. Whether this impurity had been fraudulently added, or had arisen from careless preparation of the salt or from a mode of decomposition of the pure salt at present unknown, it is impossible to say. Inasmuch as other specimens which afforded low results likewise failed to completely dissolve in the requisite quantity of cold water and also appeared to contain acid tartrate of potassium, it seems not improbable that the crystallized salt is subject to spontaneous decomposition. This supposition is strengthened by the observation that each of these same specimens yielded, when mixed with cold water, more or less of an insoluble residue consisting of antimony oxide. Experiments are now being made with pure tartar emetic to test the correctness of this suggestion.

5. The Preparation of a Stable Salt for use in Medicine.

It would be a distinct advantage if it were required that the anhydrous salt should alone be used in medicine. It is, as we have shown, easily prepared pure, and when once prepared it is not, as the hydrous crystals are, liable to spontaneous change, and in addition it is more readily soluble in water. To prepare the anhydrous salt a strong aqueous solution of tartar emetic is precipitated by a large excess of methylated spirit, the precipitate is decanted or filtered, washed with methylated spirit, and quickly dried over a water-bath. The specific rotation of aqueous solutions of this salt has been mentioned in a previous part of this paper. The solubility in water was determined at 15°. It was found that 1 part of the salt dissolved in 14·53 parts by weight of water.

[*The discussion on this paper is printed on p.* 397.]

NOTE ON TWO RESINS USED BY THE ANCIENT EGYPTIANS.*

BY E. M. HOLMES, F.L.S.

I. A few months since a small jar of resin was brought for identification by Mr. Flinders Petrie, of the Egypt Exploration Expedition. This jar, which was in a perfect state, was disinterred from a heap of rubbish found among the ruins of Naucratis, and dates from the sixth century, B.C. Naucratis was at this time the only Greek colony in Egypt, and it was through this town alone that trade with Greece was permitted.

The jar contained about 8 ounces of resin, which had become opaque and of a brown colour where it had been exposed to the air, and on the inner surface of the jar, where, owing to the porous character of the earthenware, oxidation would also take place. Under this opaque layer the resin was partly of a clear golden yellow colour and partly of a darker tint, but still quite transparent. When chewed it softened in the mouth like mastich, and had also a taste resembling that resin, but possessed in addition the peculiar flavour characterizing Chian turpentine. When rubbed between the fingers the elemi or fennel-like odour of Chian turpentine was distinctly noticeable. The contents of the jar also appeared to yield to the pressure of the knife used to remove portions of the resin.

It appeared probable, therefore, that the contents of the jar consisted of the last-named drug, which differs from mastich in its softer consistence and in its odour and taste.

Chian turpentine, moreover, is readily soluble in spirit of wine, while mastich is soluble only to the extent of 90 per cent.

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, November 14.

The characters of a genuine specimen of Chian turpentine, collected near Smyrna by M. Sydney Maltass, are given in 'Pharmacographia' as follows :—

"It was, after ten years, of a yellowish colour, scarcely fluid, though perfectly transparent, nearly of the odour of melted colophony or mastich, and without much taste. We found it readily soluble in spirit of wine, amylic alcohol, glacial acetic acid, benzol and acetone, the solution in each case being very slightly fluorescent. The alcoholic solution reddens litmus, and is neither bitter nor acrid. Two parts of this genuine turpentine dissolved in 1 of acetone, deviate a ray of polarized light 7° to the right in a column 50 mm. long.

"Chian turpentine as found in commerce and believed to be genuine is a soft solid, becoming brittle by exposure to the air; viewed in mass it appears opaque and of a dull brown hue. If pressed while warm between two slips of glass, it is seen to be transparent, of a yellowish-brown, much contaminated by various impurities in a state of fine division. It has an agreeable mild terebinthinous odour and very little taste. The whitish powder with which old Chian turpentine becomes covered showed no trace of crystalline structure when examined under the microscope."

To test the conclusion at which I had arrived, viz., that the resin in question consisted of Chian turpentine, several portions of it were, at my request, kindly examined by Mr. E. J. Eastes, in the Laboratory of the Society, with the result that it was found to be soluble in ten parts of all the solvents above mentioned, the solutions being also very slightly fluorescent.

A very small flocculent deposit formed in the solutions after a time, and the solution in glacial acetic acid was at first turbid, clearing, however, in about forty hours, and affording no more deposit than the other solutions.

The alcoholic solution faintly reddened litmus, but although not acrid, was slightly bitter. The bitter taste was not, however, perceptible on chewing the resin. It was not found possible to ascertain the rotary power of a solution in acetone of the strength above mentioned, so that a comparison in this particular could not be made. On examination under the microscope a few distinct crystals were seen.

On dissolving a commercial specimen of the Chian turpentine collected during the present century similar flocculent deposits were found in the same solvents

Judging from the slight bitterness of the alcoholic solution and from the presence of crystals in the Egyptian specimen it appears possible that the latter may have contained a small admixture of coniferous turpentine.

It is possible however that both the bitterness and the crystals might be due to changes which had taken place in the resin during the long period since its collection, for on breaking it does not manifest the odour of coniferous resins, nor does the taste indicate an admixture. It may then, I think, be concluded from the taste, odour, plastic character when chewed, and its solubility in alcohol that the resin in question is Chian turpentine.

From an historical point of view the finding of this oleoresin is of considerable interest. Professor Flückiger informs me that he possesses no evidence that the old Egyptians were acquainted with the resin. Dioscorides, a native of Cilicia in Asia Minor, who wrote about 77–78 A.D., states (Book I., c. xci., p. 94) that the resin is imported from Arabia Petræa, but mentions that the tree grows also in India, Syria, Cyprus, Libya, and the Cyclades, and that it was considered the best of all the resins for medicinal use, mastich coming next in value, and then the coniferous resins. But the earliest mention made of it appears to be by Theophrastus, who lived in the Isle of Lesbos from 370 to 285 B.C., and who briefly refers to the resin. The discovery of this pot of resin, therefore, carries the history of the commerce of the drug another two hundred years further back.

II. The next resin which I have to bring under notice is one that was found on a mummy cloth, on the body of a person to all appearance of some rank.

It was brought to me by Mr. Percy Newberry, who tells me it was found in Hawara Cemetery, in the Fayum province of Lower Egypt, and that it dates from a period not earlier than the 2nd century A.D. He had noticed that when heated in a flame, it gave off the irritating vapour of benzoic acid and the fragrant odour of benzoin. On repeating the experiment, I observed that not only were the vapours of benzoic acid given off, but that a decided vanilla odour was recognizable also. The quantity of resin present on the portion of mummy cloth brought me was too small to experiment further upon with any probability of a satisfactory result. The resin was of the peculiar reddish-brown colour assumed by benzoin when exposed to air and light for some time. Its marked vanilla odour seemed to point to the conclusion that it must be Siam benzoin, which is the only variety in which this odour is easily recognizable. But the authors of 'Pharmacographia' state that there is no evidence that the Greeks and Romans, or even the earlier Arabian physicians, had any acquaintance with benzoin.

The only similar product with which the ancients would seem to have been acquainted is storax in the tear, a product which is no longer to be met with in European commerce. This was a solid resin in unctuous tears, but otherwise somewhat resembling benzoin in its fragrant balsamic odour, and was held in great estimation from the time of Dioscorides and Pliny down to the close of the last century.

But there is no evidence to show that this storax possessed a vanilla odour, nor that it was known to the Egyptians, or was carried to Egypt as an article of commerce. That storax was known in Palestine, appears, however, from the book of Ecclesiasticus, ch. xxiv., 15, where wisdom is compared to the pleasant odour yielded by galbanum, onyx, and sweet storax. Although there is no direct evidence that benzoin was known to the old Egyptians, it may be here remarked that it seems very extraordinary that while *lignum aloes* was known and used in Judæa in the time of Solomon, benzoin, which in later records ('Pharmacographia,' p. 404) is frequently mentioned in connection with it, should have been unknown to ancient authors.

The peculiar resemblance in tint and opacity of the white tears of benzoin to the human finger nail, seems to me to point to the possibility of benzoin being the onyx or onycha of the ancients. The passage quoted from Ecclesiasticus appears to indicate a sweet smelling substance. The operculum

of certain shell-fish (*Strombus sp.*), with which onycha has generally been identified, certainly cannot be said either to possess a sweet odour or to give off fragrance when burning.

Siam benzoin may however have been the Indian frankincense described by Dioscorides (A., lxxxi). This was tawny and of a livid colour, and in a quadrate form. This suggestion receives some colour from the fact that benzoin is still known in the East by the same name as frankincense, viz., "Luban," the word benzoin or benjamin itself being only a corruption of the word "Luban-Jawi" or Java frankincense. The celebrated Arabic traveller Ibn Batuta, who visited Sumatra in 1325–49, also describes it under the name of Java frankincense.

[*The discussion on this paper is printed at p.* 399.]

THE PRACTICAL APPLICATIONS OF ELECTRICITY.*

BY WALTER HENRY PREECE, F.R.S, M.INST.C.E., ETC.

(*Concluded from page* 372.)

The steam-engine has received equal attention. The economy of the electric light when steam is used depends almost entirely on the consumption of coal. With slow-speed low-pressure engines one kilowatt (1000 watts, $1\frac{1}{3}$ horse-power) may consume 12 lbs. of coal per hour; in high-speed, high-pressure, triple-expansion engines it need not consume more than 1 lb. of coal per hour. Willans and Robinson have actually delivered from a dynamo one kilowatt by the consumption of 2 lbs. of coal per hour, or by the condensation of 20 lbs. of steam.

There is a great tendency to use small economical direct-acting engines in place of large expensive engines, which waste power in countershafting and belts. Between the energy developed in the furnace in the form of heat, and that distributed in our rooms in the form of light, there have been too many points of waste in the intermediate operations. These have now been eliminated or reduced. Electricity can now be produced by steam at 3*d.* per kilowatt per hour. The kilowatt hour is the Board of Trade unit as defined by the Act of 1882, for which the consumer of electric energy has to pay. Its production by gas engines costs 6*d.* per kilowatt hour, while by primary batteries it costs 3*s.* per kilowatt-hour. The Grosvenor Gallery Company supply currents at $7\frac{1}{4}d.$ per kilowatt-hour; a 20 candle-power lamp consuming 3 watts per candle, and burning 1,200 hours per annum, expends 82,000 watt-hours or 82 kilowatt-hours, and it costs, at $7\frac{1}{4}d$ per unit, 50*s.* per annum. If the electricity be produced on the premises, as is the case in the Post Office, in the House of Commons, and in many large places, it would cost 20*s.* 6*d.* per annum. I have found from a general average under the same circumstances and for the same light in the General Post Office in London that an electric glow lamp costs 22*s.* and a gas lamp 18*s.* per annum. The actual cost of the production of one candle light per annum of 1,000 hours is as follows:—

Sperm candles	8*s.*	6*d.*
Gas (London)	1	3
Oil (petroleum)	0	8
Electricity, glow	0	9
„ arc	0	$1\frac{1}{2}$

The greatest development of the electric light has taken place on board ship. Our Admiralty have been foremost in this work. All our warships are gradually receiving their equipment. Our ocean-going passenger ships are also now so illumined, and perhaps it is here that the comfort, security, and true blessedness of the electric light is experienced.

Railway trains are also being rapidly fitted up. The express trains to Brighton have for a long time been so lighted, and now several northern railways, notably the Midland, are following suit. Our rocky coasts and prominent landfalls are also having their lighthouses fitted with brilliant arc lamps, the last being St. Katherine's Point on the Isle of Wight, where 60,000 candles throw their bright beams over the English Channel, causing many an anxious mariner to proceed on his way rejoicing.

Fontaine showed in Vienna, in 1873, that a dynamo was reversible—that is, if rotated by the energy of a moving machine, it would produce electric currents; or, if rotated by electric currents, it would move machinery. An electric current is one form of energy. If we have at one place the energy of falling water, we can, by means of a turbine and a dynamo, convert a certain portion of the energy of this falling water into an electric current. We transmit this current through proper conductors to any other place we like, and we can again, by means of a motor, convert the energy of the current into mechanical energy to do work by moving machinery, drawing tramcars, or in any other way. We can in this way transmit and utilize 50 per cent. of the energy of the falling water wherever we like. The waste forces of nature are thus within our reach. The waterfalls of Wales may be utilized in London; the torrents of the Highlands may work the tramways of Edinburgh; the wasted horse-power of Niagara may light up New York. The falls of Bushmills actually do work the tramway from Portrush to the Giant's Causeway, and those of Bessbrook the line from Newry to Bessbrook.

The practicability of the transmission of energy by currents is assured, and the economy of doing this is a mere matter of calculation. It is a question of the relative cost of the transmission of fuel in bulk, or of the transmission of energy by wire. Coal can be delivered in London for 12*s.* per ton. The mere cost of the upkeep of a wire between Wales and London to deliver the same amount of energy would exceed this sum tenfold. For long distances the transmission of energy is at present out of the question. There can be no doubt, however, that for many purposes within limited areas the transmission of energy by electricity would be very economical and effective. Pumps are worked in the mines of the Forest of Dean; cranes are moved in the works of Easton and Anderson at Erith; lifts are raised in banks in London; water is pumped up from wells to cisterns in the house of Sir Francis Truscott, near East Grinstead; ventilation is effected and temperature lowered in collieries; goods, minerals, and fuel can be transmitted by telpherage.

The transmission of power by electricity is thus within the range of practice. It can be distributed during the day by the same mains which supply currents for light by night. Small industries, such as printing, watch-making, tailoring, boot-making, can be cheaply supplied with power. It is thus brought into direct competition with the distribution of power by steam as in America, or by air-pressure as in Paris, or by high-pressure water as in London; and the relative advantages and economies of each system are simple questions of calculation. When that evil day arrives that our supply of natural fuel ceases, then we may look to electricity to bring to our aid the waste energies of nature—the heat of the sun, the tidal wave of the ocean, the flowing river, the roaring falls, and the raging storm.

There is a mode of transport which is likely to create a revolution in the method of working tramways. A tramcar carries a set of accumulators which supplies a current to work a motor geared to a pair of wheels of the car. The weight, price, day's work, and life of the accumulator is curiously the same as the weight, price, day's work, and life of horseflesh; but the cost of

* Presidential Address to the Mechanical Science Section of the British Association at Bath.

maintenance, the liability to accident, and the chances of failure are much less. Although very great improvements in batteries have been made, and they are now really practical things, sufficient experience in tramcar working has not yet been obtained to say that we have reached the proper accumulator. Nor have we yet acquired the best motor and mode of gearing; but very active experiments are being carried out in various countries, and nothing can prevent their ultimate success.

The property, which the electric current possesses, of doing work upon the chemical constitution of bodies so as to break up certain liquid compounds into their constituent parts, and marshal these disunited molecules in regular order according to a definite law upon the surfaces of metals in contact with the liquid where the current enters and exists, has led to immense industries in electro-metallurgy and electro-plating. The extent of this industry may be gathered from the fact that there are 172 electro-platers in Sheffield and 99 in Birmingham. The term electro-metallurgy was originally applied to the electro-deposition of a thin layer of one metal on another; but this is now known as electro-plating.

In 1839 Jacobi in St. Petersburg and Spencer in Liverpool laid the foundations of all we know of these interesting arts. Copper was deposited by them so as to obtain exact reproductions of coins, medals and engraved plates. The first patents in this country and in France were taken out by Messrs. Elkington of Birmingham, who still occupy the foremost position in the country.

The fine metals, gold and silver, are deposited in thin layers on coarser metals, such as German silver, in immense quantities. Christofle of Paris deposits annually six tons of silver upon articles of use and of art, and if the surfaces so electro-plated were spread out continuously they would cover 140 acres.

The whole of the copper plates used in Southampton for the production of our splendid ordnance survey maps are deposited by copper on matrices taken from the original engraved plates, which are thus never injured or worn, are always ready for addition or correction, while the copies may be multiplied at pleasure and renewed at will.

Nickel-plating, by which the readily oxidizable metals like iron are coated with a thin layer of the more durable material nickel, is becoming a great industry; the trappings of harness, the exposed parts of machinery, the fittings of cycles and carriages, and innumerable articles of daily use are being rendered not only more durable but more beautiful.

The electro-deposition of iron, as devised by Jacobi and Klein, in the hands of Professor Roberts-Austen, F.R.S., is giving very interesting results. The dies for the coins which were struck at our Mint on the occasion of the Jubilee of the Queen, were modelled in plaster, reproduced in intaglio by electro-deposition of copper, and on these copper moulds hard excellent iron in layers of nearly $\frac{1}{10}$th of an inch was deposited.

The exact processes of measurement, which have led to such vast improvement in our telegraphic systems, have scarcely yet penetrated into this field of electrical industry, and little is known at present of the exact relations of current and electromotive force with respect to surfaces of contact, rate of deposit, and resistance of liquids. Captain Sankey, R.E., of the Ordnance Survey Department, has done some useful work in this direction.

The extraction of metals from their ores by deposition has received wide application in the case of copper. In 1871 Elkington proposed to precipitate copper electrolytically from the fused sulphide of copper and iron known to the copper smelter as "regulus." Thin copper plates were arranged to receive the deposited copper, while the foreign metals, including gold and silver, fell to the bottom of the solution, the process being specially applicable, it was supposed, to regulus containing small quantities of the precious metals.

The electrical purification of copper from impure "blister copper" or "blade copper" has also made great progress, and special dynamos are now made which will, with an expenditure of 100 horse-power, precipitate 18 tons of copper per week. The impure metal is made to form the anode in a bath of sulphate of copper, the metal being deposited in the pure form on a thin copper cathode.

It was not very long ago considered very economical to absorb ·85 horse-power in depositing one pound of copper per hour, but now the same work can be done with ·3 horse-power. Mr. Parker, of Wolverhampton, has done good work in this direction, and his dynamos in Messrs. Bolton's works have revolutionized this process of purification.

Both at Swansea and Widnes immense quantities of copper, in spite of the restrictive operations of the copper syndicate, are being produced by electro-deposition. Copper steam pipes for boilers are now being built up of great firmness, fine texture, and considerable strength by Mr. Elmore at Cockermouth, by electro-deposition on a rotating mandril in a tank of sulphate of copper. By this process one ton of copper requires only a little more than one ton of coal to raise the requisite steam to complete the operation.

It has been shown that the electrolytic separation of silver from gold by similar methods is perfectly practicable. The value of the material to be dealt with may be gathered from the fact, communicated to the "Gold and Silver Commission" now sitting, that nearly 90,000,000 ounces of silver are annually produced, and the greater portion of this amount contains sufficient gold to render refining remunerative. Although the old acid process of "parting" gold and silver remains practically undisturbed, there seems no reason to doubt that in the future electricity will render us good service in this direction as it has already in the purification of copper.

There is not much actual progress to report in the extraction of gold from its ores by electrical agency. The conversion of gold into chloride of gold by the direct or indirect action of chlorine is employed on a very large scale in [Grass Valley] California and elsewhere. This fact has led to well-directed efforts to obtain by electrolytic action, chlorine which should attack finely divided gold suspended (with the crushed ore) in the solution from which the chlorine was generated, the gold, so converted into soluble chloride, then being deposited on a cathode. The process would seem to be hopeful, but is not as yet a serious rival to the ordinary chlorination method.

In the amalgamation of gold ores much is expected from the possibility of keeping clean, by the aid of hydrogen set free by the electric current, the surfaces of amalgamated plates.

It is well known that the late Sir W. Siemens considered that the electric arc might render good service in the fusion of metals with high melting points, and he actually succeeded in melting 96 ounces of platinum in ten minutes with his electrical furnace. The experiments were interrupted by his untimely death, but in the hands of Messrs. Cowles the electric arc produced by 5000 ampères and 500 horse-power is being employed on a very large scale for the isolation of aluminium (from corundum), which is immediately alloyed (*in situ*) with copper or iron, in the presence of which it is separated. The heating power of large currents has been used by Elihu Thomson in the United States, and by Bernardos in Russia, to weld metals, and it is said to weld steel without affecting its hardness. It has even been proposed to weld together in one continuous metallic mass the rails of our railways so as to dispense entirely with joints.

The production of chlorine for bleaching and of iodine for pharmaceutical purposes, the economical production of oxygen, are also processes now dependent on the electrolytic effect of the electric current.

It is almost impossible to enumerate the various general purposes to which electricity is applied to minister to our wants, and to add to our comforts. Every one appreciates the silent efficiency of the trembling electric bell, while all will sooner or later derive comfort from the perennially self-winding electric clock. Correct mean time is distributed throughout the length and breadth of the land by currents derived from Greenwich Observatory. Warehouses and shops are fitted with automatic contact pieces, which, on any undue increase of temperature due to fire create an alarm in the nearest fire station; and at the corner of most streets a post is found with a face of glass, which on being broken enables the passer-by or the watchful and active policeman to call a fire engine to the exact spot of danger. Our sewers are likely to find in its active chemical agency a power to neutralise offensive gases, and to purify poisonous and dangerous fluids. The germs of disease are attacked and destroyed in their very lairs. The physician and the surgeon trust to it to alleviate pain, to cure disease, to effect organic changes beyond the reach of drugs. The photographer finds in the brilliant rays of the arc lamp a miniature sun which enables him to pursue his lucrative business at night, or during the dark and dismal hours of a black November fog of London.

We learn from the instructive and interesting advertising columns of our newspapers that "electricity is life," and we may perhaps read in the more historical portion of the same paper that by a recent decision of the New York Parliament, "electricity is death." It is proposed to replace hanging by the more painless and sudden application of a powerful electrical charge; but those who have assisted at this hasty legislation would have done well to have assured themselves of the practical efficacy of the proposed process. I have seen the difficulty of killing even a rabbit with the most powerful induction coil ever made, and I know those who escaped and recovered from the stroke of a lightning discharge.

The fact that the energy of a current of electricity, either when it flashes across an air space, or when it is forced through high resistance, assumes the form of heat of very high temperature, led early to its employment for firing charges of gunpowder; and for many civil military and naval purposes it has become an invaluable and essential agent. Wrecks like that of the *Royal George* at Spithead were blown up and destroyed; the faces of cliffs and quarries are thrown down; the galleries of mines and tunnels are excavated; obstructions to navigation like the famous Hell Gate, near New York, have been removed; time guns to distribute correct time are fired by currents from Greenwich at 1 p.m. In the operations of war, both for attack and defence, submarine mining has become the most important branch of the profession of a soldier and a sailor. Big guns, whether singly or in broadside, are fired, and torpedoes, when an enemy's ship unwittingly is placed over them, are exploded by currents of electricity.

An immense amount of research has been devoted to design the best form of fuse, and the best form of generator of electricity to use to explode them. Gun tubes for firing consist of a short piece of very fine wire embedded in some easily fusible compound, while the best form of fuse is that known as the Abel fuse, which is composed of a small, compact mass of copper phosphide, copper sulphide, and potassium chlorate. The practice in the use of generators is very various. Some, like the Austrians, lean to the high tension effects of static electricity; others prefer magneto machines; others use the dynamo; while we in England cling with much fondness to the trustworthy battery. Since the electric light has also become such a valuable adjunct to war purposes, it is probable that secondary batteries will become of immense service. The strong inductive effects of atmospheric electricity are a source of great danger. Many accidental explosions of fuses have occurred. An experimental cable with a fuse at one end was laid below low water-mark along the banks of the Thames at Woolwich. The fuse was exploded during a heavy thunderstorm. The knowledge of the causes of a danger is a sure means for the production of its removal, or of its reduction to a minimum. Low tension fuses and metallic circuits reduce the evils of lightning, but have not removed them. Should war unhappily break out again in Europe, submarine mining will play a very serious part, and, paradoxical as it may appear—as has been suggested by the French ambassador, M. Waddington—its very destructiveness may ultimately prove it to be a powerful element of peace.

It seems incredible that, having utilized this great power of nature to such a wide and general extent, we should be still in a state of mental fog as to the answer to be given to the simple question—What is electricity? The engineer and the physicist are completely at variance on this point. The engineer regards electricity, like heat, light, and sound, as a definite form of energy, something that he can generate and destroy, something that he can play with and utilize, something that he can measure and apply. The physicist—at least some physicists, for it is difficult to find any two physicists that completely agree with each other—regard electricity as a peculiar form of matter permeating all space as well as all substances together with the luminiferous ether which it permeates like a jelly or a sponge. Conductors, according to this theory, are holes or pipes in this jelly, and electrical generators are pumps that transfer this hypothetical matter from one place to another. Other physicists, following Edlund, regard the ether and electricity as identical, and some, the disciples of Helmholtz, consider it as an integral constituent of nature, each molecule of matter having its own definite charge, which determines its attraction and its repulsion. All attempts to revive the Franklinian, or material theory of electricity, have, however, to be so loaded with assumptions, and so weighted with contradictions, that they completely fail to remove electricity from the region of the mysterious. It is already extremely difficult to conceive the existence of the ether itself as an infinitely thin, highly elastic medium, filling all space employed only as the vehicle of those undulatory motions that give us light and radiant heat. The material theory of electricity requires us to add to this another incomprehensible medium imbedded or entangled in this ether, which is not only a medium for motion, but which is itself moved. The practical man, with his eye and his mind trained by the stern realities of daily experience, on a scale vast compared with that of the little world of the laboratory, revolts from such wild hypotheses, such unnecessary and inconceivable conceptions, such a travesty of the beautiful simplicity of nature.

He has a clear conception of electricity as something which has a distinct objective existence, which he can manufacture and sell, and something which the unphilosophic and ordinary member of society can buy and use. The physicist asserts dogmatically: "Electricity may possibly be a form of matter—it is not a form of energy." The engineer says distinctly: "Electricity is a form of energy—it is not a form of matter; it obeys the two great developments of the present generation—the mechanical theory of heat and the doctrine of the conservation of energy." There must be some cause for this strange difference of views. It is clear that the physicist and the engineer do not apply the term electricity to the same

thing. The engineer's electricity is a real form of energy; the speculative philosopher's electricity is a vague subjective unreality which is only a mere factor of energy and is not energy itself. This factor, like force, gravity, life, must, at any rate for the present, remain unknowable. It is not known what force is, neither do we know what is matter or gravity. The metaphysician is even doubtful as regards time and space. Our knowledge of these things commences with a definition. The human mind is so unimpressionable, or language is so poor, that writers often cannot agree even on a definition. The definition of energy is capacity for doing work. We practical men are quite content to start from this fiducial line, and to affirm that our electricity is a something which has a capacity for doing work; it is a peculiar form of energy. The physicist may speculate as much as he pleases on the other side of this line. He may take the factors of energy, and mentally play with them to his heart's content; but he must not rob the engineer of his term *electricity*. It is a pity that we cannot settle our difference by changing the term. Physicists might leave the term *electricity* to the form of energy, which is an objective reality, and which the ordinary mortal understands; while engineers would be quite content if speculative physicists and enthusiastic mathematicians would call their subjective unreality, their imaginary electrical matter, by some other term. If it be necessary to mentally create some imaginary matter to fulfil the assumptions and abstractions of their mathematical realizations, let them call it *coulombism* or *electron*, and not appropriate the engineer's generic and comprehensive term electricity. The engineer finds the motions of existing matter and of the ether quite sufficient to meet all his requirements, and to account for all those phenomena which are called electrical.

I cannot pretend to have given a survey of all the practical applications of electricity. I have but briefly indicated the present area covered by the new and rapidly-growing industry. Five million people upon the globe are now dependent on the electric current for their daily bread. Scarcely a week passes without some fresh practical application of its principles, and we seem to be only on the shore of that sea of economy and beneficence which expands with every new discovery of the properties of electricity, and spreads already beyond the mental grasp of any one single worker.

PHARMACY ACT, 1868.

RECTIFICATION OF THE REGISTERS OF PHARMACEUTICAL CHEMISTS AND CHEMISTS AND DRUGGISTS.

We are requested by the Registrar to publish the following list of persons whose names will be erased from the Registers unless they communicate with him on or before December 31 next.

Those marked (*) are Pharmaceutical Chemists.

Acton, Frederick George ..	226, Marylebone Rd., London, N.W.
Adamson, William Stewart	30, George Street. Aberdeen.
Addison, Joseph	10, Green Lane, Hull.
Adkins, Samuel.....	240, Park Road, Soho, Birmingham.
Akerman, James	Marazion, Cornwall.
Althorp, Arthur.....	475, York Road, Wandsworth, London, S.W.
Anderson, Andrew	89, Whitfield Street, Fitzroy Square, London, W.
Anderson, Howard Gibson..	Caxton House, St. Wilfrid's Road, New Barnet, Herts.
Anderson, William Fettes ..	Thymefield Villa, New Prestwick, Ayr, N.B.
Andrewes, Henry Manning	134, Theobald's Road, London, W.C.
Atkinson, John.....	Manchester.
Atkinson, Joseph	56, Ducie Street, Greenheys, Manchester.
Atkinson, Miles Christopher	Rahoor House, Galway, Ireland.
Bache, William	157, North Hill Street, Liverpool.
Bachelot, Emile.....	54, Red Rock Street, West Derby Road, Liverpool.
Badcock, Henry Southgate Robertus	37, Cranbury Avenue, Southampton.
Baker, Henry Rutter	St. John's Wood, London, N.W.
Bakewell, William Whitehorn	84, Blenheim Crescent, London, W.
Bannister, Theophilus Mayo	12, York Buildings, Adelphi, London, W.C.
Barnitt, Francis.....	15, Old Bond Street, Bath.
Barrett, John Richard.....	281, Brixton Road, London, S.W.
Bateman, Thomas.....	86, Waverley Street, Hull.
Bates, Edward	Market Square, Brackley.
Battman, Thomas	63, Finsbury Pavement, London, E.C.
Baxter, John James.....	Union Street, Willenhall, Staffordshire.
Bayley, John	7, Pinners Brow, Townsend, Warrington, Lancs.
Bayne, Charles	34, Howe Street, Edinburgh.
Beall, George	Highbury House, Princess Avenue, The Park, Hull.
Beattie, John	138a Strand, London, W.C.
Beaumont, Charles Frederic Joseph Briggs.....	St. John's Terrace, Cleethorpe Rd., Great Grimsby.
Beck, Francis Henry	Allbrighton, Salop.
*Bell, William Henry	York.
Bendelack, Charles	Lower Addiscombe Road, Croydon.
Betts, John Howes	27, High Street, Rochester.
Biffin, Thomas	254, Upper Street, Islington, London, N.
*Bird, Robert	37, Bedford Row, London, W.C.
Bishop, James	10, Cotside Terrace, Lavender Hill, London, S.W.
Blaxall, Arthur Simon	74, Chancery Lane, London, W.C.
Blezard, Thomas	Slaidburn, Yorks.
Blott, Herbert	67, Victoria Dock Road, London, E.
Boyce, Alfred	Hayward's Heath, Sussex.
Bradbury, Joseph	5, Church Street, Mile End New Town, London, E.
Bromley, William	39, Napier Street, Newcastle-on-Tyne.
Bruce, Charles Frederick ..	117, Stirling Road, Glasgow.
Buckley, Elizabeth	Huddersfield Road, West Town, Dewsbury.
Burrell, John Benjamin	High Street, Rayleigh, Essex.
Burton, William.....	122, High Street, Harborne, Birmingham.
Byrne, Frank Joseph	34, High Street, Notting Hill, London, W.
Caithness, James	Lochgilphead, Argyleshire.
Cant, John Reymer	28, Lorne Street, Stockton-on-Tees.
Capon, Charles William	75, Frampton Park Road, Hackney, London, E.
Carman, William Walter....	Frodsham Street, Chester.
Carrell, George	Empingham, Stamford.
Carritt, William.....	Louth, Lincolnshire.
Castell, Joseph	Daventry, Northamptonshire.
*Chamberlain, Arthur Garratt	3, Market Place, Rugby.
Charlton, Matthias James ..	Merton Colliery, Durham.
Childs, Philip.....	Speenhamland, Newbury.
Christian, William	Gilling, near Richmond, Yorks.
Clapperton, William George.	610, Myrtle Avenue, Brooklyn, U.S.A.
Clark, Agnes	West Hillside, Ayrshire.
Clarke, James.....	20 ,Guild Street, Burton-on-Trent.
Clarke, Ralph Tate	4, Mannering Road, Liverpool.
Clarke, Tom Gilliam Burn ..	Shirley Terrace, Turnpike Lane, Hornsey, London, N.
Clarkson, Albert	42, Ice Street, Blackburn, Lancs.
Clifford, Richard Noon	51, Cauldwell Street, Bedford.
Cole, George William	2, Westminster Chambers, Victoria Street, London, S.W.
Coleman, Francis	Welwick, near Patrington, Yorks.
Conway, William	Pontypool, Mon.
Cooper, Thomas.....	1, Richmond Terrace, New Hall Lane, Preston, Lancs.
Cooper, William Whateley Russell	1, Princess Road, Kilburn, London.
Coslett, Thomas Watts	44, High Street, Brierley Hill.
Cowdery, Frederic	146, Hockley Hill, Birmingham.
Cox, Oliver	342, Kings Road, Chelsea, London, S.W.
Crawshaw, Henry.....	99, Woodhouse Lane, Leeds.
Crowder, Charles Joseph Hughes	66, Brecknock Road, London, N.
Dadley, Solomon	36, Archdeacon Lane, Leicester.
Dain, Leopold.....	33, Popham Road, Islington, London, N.
Davids, George Ware	1, Alfred Villas, Bury Street, Lower Edmonton.
Davies, George	Tisbury, Salisbury.
Davies, Thomas	2, Albert Bridge, Manchester.
Davis, Francis.....	115, Eccles New Road, Salford, Manchester.
Davis, James Andrew	Anderton Road, Sparkbrook, Birmingham.

Davison, Edward	299, Holloway Road, London, N.
Dawson, Augustus Henry	65, Lion Street, New Kent Road, London, S.E.
Day, Charles	24, Holywell Street, Strand, London, W.C.
Densham, Robert Comins	52, Culvert Road, Battersea Park, London, S.W.
Dickens, George	175, High Street, Poplar, London, E.
Dixon, James	97, Tontine Street, St. Helen's, Lancs.
Dodgson, Fred Henry	5, Arlington Square, Islington, London, N.
Doughty, Miles	29, Temple Street, St. George's Road, Southwark, London, S.E.
Draper, James William	59, Barnsbury Road, Islington, London, N.
*Dumolo, John Thomas	Kettlebrook Colliery, Tamworth.
Duncombe, William Pauncefort	Sunninghill, Berks.
Earland, William	Bexley, Kent.
Edey, George	High Street, Christchurch, Hants.
Edwards, Henry	High Street, Bracknell, Berks.
Edwards, Walter Belsey	Southgate Road, Wood Green, London, N.
Errington, Thomas Dryden	120, Elswick Road, Newcastle-on Tyne.
Evans, Richard	Llandovery.
Farndon, Levi	67, Harrow Road, Kensal Green, London, W.
Farnworth, James	76, Kay Street, Little Bolton, Lancs.
Farrant, Samuel George	Bampton, Devon.
Fell, George	Boothroyd Lane, Dewsbury, Yorks.
Fenton, Thomas	7, Poultry, London, E.C.
Ferriday, Arthur Harry	28, Reedworth Street, Kennington Road, London, S.E.
Field, John	56, Marine Parade, Brighton.
Fincham, Newton Thornton	40, Mall Road, Hammersmith, London, W.
Fleming, John	220, High Holborn, London, W.C.
Flood, James Francis	High Felling, Gateshead-on-Tyne.
Forster, Francis Alexander	4, Dawson Terrace, Haverstock Hill, London, N.W.
Foster, William	33, Beak Street, Regent Street, London, W.
Fowke, Robert Main	Earls Barton, Northamptonshire.
Fox, George	West Town, Dewsbury, Yorks.
Francis, Frederick Charles	315, Edgware Road, London, W.
Fryer, John	19, The Terrace, Camberwell, London, S.E.
Gallimore, Thomas	2, Denison Place, Rusholme, Manchester.
Geary, Edwin	Hatherton House, Hatherton, near Cannock, Staffordshire.
Gimson, Joseph	High Street, Epsom, Surrey.
*Glanfield, George	Torquay.
Glazier, Walter Henry	20, Boundary Road, London, N.W.
Goodall, John Edward	45, Montpelier Road, St. John's College Park, London, N.W.
Gray, Philip	7, Ravenswood Road, Bristol.
Grayson, Charles	Holme-on-Spalding Moor, Yorks.
Greaves, Bernard George	Buchin, Lee, Dronfield, near Sheffield.
Green, John Ayre	56, Water Lane Hill, Brixton. London, S.W.
Greening, William Henry	Elm House, Wisewood, Attercliffe, Sheffield.
Gregory, Frank	11, South Street, Chichester.
Griffin, George Edward	5, Denman Street, London Bridge, London, S.E.
*Grindley, Robert Dutton	7, West Hill, Highgate, London, N.
Grove, Thomas William	Coventry Street, Kidderminster.
Gwillim, John Cole	Richmond House, Malvern Link.
Hall, John Thomas	23, Alma Square, St. John's Wood, London, N.W.
Hall, Thomas Henry	2, Bank Street, Sheffield.
Hannah, Joseph	119, North Montrose Street, Glasgow.
Harding, Robert	10, Oxford Street, High Wycombe, Bucks.
Harold, John Patrick	103, Guilford Street, London, W.C.
Harris, William	Brynamman, Carmarthenshire.
Harrison, Arthur John	28, Reedworth Street, Kennington Cross, London, S.E.
Harrison, Jonathan	Hyde Lane, Hyde, Cheshire.
Harrison, Walter Reginald	30, Claremont Terrace, Pendleton, Lancs.
Haslam, Charles Junius	19, Clayton Street, Newcastle-on-Tyne.
Hay, William	49, Abbey Road, St. John's Wood, London, N.W.
Heath, Walter Edwin	Kidderminster.
Higgins, Andrew Henry	1a, Lamb's Passage, Chiswell Street, London, E.C.
Higgs, Alfred Henry	83, Central Street, St. Luke's, London, E.C.
Highley, Edward James	4, East View, Pinder Fields, Wakefield.
Hillgenberg, Eliza	38, Hounsditch, London, E.
Hitchcock, Samuel Conder	87, Digby Road, Brownswood Park, London, N.
Hobson, Thomas Bartram	45, Powell Street, Sheffield.
Hodder, Henry	23, Newark Street, Attercliffe, Sheffield.
Hogg, Robert William	22, Chester Place, Gateshead-on-Tyne.
Holmes, George	53, William Street, Anderston, Glasgow.
*Holmes, James Henry	153, Moor Lane, Preston.
Hookes, Robert Thomas	36, Stainsby Road, Poplar, London, E.
Hopkinson, William Henry	44, Stonehill Road, Gunnersbury, London, W.
*Hosking, Montague John Roberts	13, Chantry Road, Southampton.
Howe, William	Disley, Cheshire.
Humphreys, Maria Jane	6, Middle Marsh, Nottingham.
Humphreys, Matthew Henry	6, Middle Marsh, Nottingham.
Hunt, Andrew	12, Kensal Road, Paddington, London, W.
Hunt, James	Fakenham, Norfolk.
Irving, Peter	95, High Street, Dumfries, N.B.
Jaques, William	Wombwell, Yorks.
Jefferson, John Mitchell	28, Whitefriars Road, Hastings,
Jenkinson, Henry	Unstone, Derbyshire.
Jenkinson, Robert Ward	Unstone, Derbyshire.
Jessop, Josiah Benjamin	St. Mary Street, Newport, Salop.
John, Benjamin	35, Trinity Square, Borough, London, S.E.
*Johnson, George	Bevington Road, Aston, Birmingham.
Johnson, Henry John	High Street, Tutbury.
Johnson, Simeon Frederick Russell	22, Blossom Street, York.
Jones, James	27, Station Road, Hadfield, Derbyshire.
Judge, James	26, Larkhall Lane, Clapham, London, S.W.
Kenward, Robert	20, Candahar Place, Church Road, Kingston, Hants.
Kershaw, Thomas	Ormskirk, Lancs.
*Kineh, Charles James	8, West Kensington Terrace, London, W.
Kitchen, James	Main Street, Kilsyth, N.B.
Kittow, Tom	61, Trinity Square, London, S.E.
Knott, Edward	1, Queen Street, Hurst, Lancs.
Lacy, Herbert	36, Bow Road, London, E.
Laugher, John	Folly House, Ledbury, Herefordshire.
Leaker, John Waterman	24, Queen's Road, Norland Square, Notting Hill, London, W.
Leith, David	Kilsyth, Stirlingshire.
Lewis, George	5, Chippenham Terrace, Harrow Road, London, W.
Little, Henry	Earlsheaton, Yorks.
Long, William	33, Theresa Road, Sparkbrook, Birmingham.
Lord, James	Flixton Road, Urmston, near Manchester.
McLean, Kenneth	Loftus, Saltburn-by-the-Sea, Yorks.
McMurray, Peter Buchanan	19, George Street, Paisley.
Maddocks, Joseph	Irlams-o'-th'-height, Pendleton, Manchester.
Madge, Thomas William	10, Glenfield Street, Alexandra Parade, Glasgow.
Madgwick, Rufus	36, New Park Street, Devizes.
Marsden, Thomas	Eeclesfield, Yorks.
Marshall, James	14, Union Place, Edinburgh.
Mauchlen, Robert	29, Prospect Place, Belfast.
Meacham, James Edwin	128, Steelhouse Lane, Birmingham.
Merson, James	137, High Street, Croydon.
Middleton, Christopher	2, Osborne Terrace, Patricroft, Lancs.
Mill, George	1, Brandon Terrace, Edinburgh.
Miller, Arthur Ingelby	Birch Farm, Christleton, near Chester.
Mitchell, Frank	49, Humberstone Gate, Leicester.
Moore, John	296, Derby Road, Bootle, Liverpool.
Morgan, Henry Alfred	Tisbury, Wilts.
Morgan, Thomas William	51, Grove Road, St. John's Wood, London, N.W
Morgan, William	139, High Street, Bricrley Hill, Staffs.
Morley, Edward	5, Doveridge Terrace, Melbourne Grove, East Dulwich, London, S.E.
Morris, William	Aston House, Victoria Road, Birmingham.

Mullock, Richard	Charing Cross, Birkenhead.
Nash, John Arthur Hylton	Belvidere, London, S.E.
Nelson, Joseph	25A, Three Colts Street, Limehouse, London, E.
Newey, John Taylor	2, Spa Place, Beulah Hill, Upper Norwood, London, S.E.
Newman, Arthur Joshua	21, White Hart Street, High Wycombe, Bucks.
Nicholls, Joseph Charles	321, Hackney Road. London, E.
Nield, Abraham Milne	Hope Mills, Miller Street, Manchester.
Nobbs, James William	123, St. Leonard's Road, Bromley, London, E.
Nockolds, Stephen William	104, Goldhawk Road, Shepherd's Bush, London, W.
Oakley, James	192, Sherlock Street, Birmingham.
Ocock, Charles	2, Park Terrace, Bath Road, Bristol.
Ocock, Mary Grace	Dulverton, Somerset.
Onslow, Cyrus Edmonds	Hill Top, Attercliffe, Sheffield.
Palmer, George Smith	3, Grand Promenade, Brixton, London, S.W.
Park, John	60, St. George's Road, London, S.E.
Parry, Edwin	Axton Llanasa, near Holywell Flints.
*Parsons, Frederick	30, Gallowtree Gate, Leicester.
Pattinson, Matthew Leo	38, St. James's Street, Liverpool.
Pearce, Percy	48, Guilford Street, Russell Square, London, W.C.
*Pearson, George Brigg	Barnard Castle.
Penzer, Thomas	High Street, Walsall, Staffordshire.
Piper, Walter George	Gloucester Villa, Genoa Road, Anerley, London, S.E.
*Player, Jacob Hort	Birmingham.
Potts, Joseph	61, Tatham Street, Sunderland.
Pound, Henry	9, Calthorpe Street, Grays Inn Road, London, W.C.
Pratt, George	Harrington Road, Workington.
*Pratt, Henry James	Micklegate Bar Without, York.
Price, Charles Cleaver	Market Place, Wigan.
Priestley, William	149, Burnley Road, Accrington.
Race, Anne	238, Oldham Road, Manchester.
Rae, James	West Street, Alderley-Edge, Cheshire.
Rawlings, John	Brierley Hill, Staffordshire.
Rayner, Lloyd	333, Kingsland Road, London, E.
Read, Thomas	New Clee, Gt. Grimsby, Lincolnshire.
Reddish, John	39, Withy Grove, Manchester.
Redfern, Mary Ann	Ashby de-la-Zouch.
*Reid, David Stevenson	Helensburgh, N.B.
Richardson, Henry	Market Place, Chesterfield.
Richmond, William Wilkinson	55, Scotch Street, Carlisle.
Ritchie, John	11, Morrison Street, Edinburgh.
Ritson, Fletcher	2, Chapel Bar, Nottingham.
Ritson, Huntriss	4, Mandale Road, South Stockton.
Ritson, John	160, City Road, Hulme, Manchester.
Roberts, Morgan	Post Office, Hafod, near Pontypridd.
Robins, Harvey	Hope House, Southsea, Hants.
Robinson, Edward	1, North Terrace, Parkhurst, Hants.
Robinson, George Carr	University of Edinburgh.
Robinson, Whinfield	Torrhill House, Ivybridge, Devon.
Rogers, William	155, High Street, West Bromwich.
Ross, Charles Croll	Allahabad, East India.
Rostron, William	27, Blackburn Road, Bolton, Lancs.
Royle, Edward	209, Great Ancoats Street, Manchester.
Salmon, Thomas	51, Vale Street, Denbigh.
Sambell, John	Fore Street, Redruth, Cornwall.
*Sandall, William	Bexley Heath, Kent.
Saunders, Thomas	3, Meath Street, Battersea Park, London, S.W.
Saxby, Austin Clare	21, Doddington Grove, London, S.E.
Scaife, Martha	2, Denison Place, Rusholme, Manchester.
Scott, Joel	Hednesford, Staffordshire.
Seeley, Charles Leman	28, Reedworth Street, London, S.E.
Shaw, John	21, Merrick Square, London, S.E.
Sheldrake, George	4, Bridge Road, Dudley Hill, Bradford.
Shepherdson, Welburn	23, Lowgate, Hull.
Simon, Alfred	26, Hamilton Road, Everton, Liverpool.
Smith, Charles Clapcott	100, Rue Mondenard, Bordeaux, France.
Smith, John Sykes	78, Halton Road, London, N.
Smith, Lucius Jeffreston	Bathurst, River Gambia, Africa
Smith, Peter	Ivy Cottage, Brampton, Chesterfield.
Smith, Thomas William	2, The Walk, Barking. London. E.
Snelham, Frederick George	2, Chatsworth Street, Edge Hill, Liverpool.
Southon, James Edward	The Moat, Capel, Paddock Wood, Kent.
Spratt, George Uriah	Sneinton Road, Nottingham.
Spreckley, George	183, Lower Kennington Lane, London, S.E.
Standish, William	West Street, Warwick
Staning, William	White Horse Street, Leeds.
Starie, William Chantler	59, Old Street, Ludlow.
Steede, Richard	64, Coldharbour Lane, Camberwell, London, S.E.
Stelfox, Abraham	98, Church Street, Eccles, Lancs.
Stevens, Henry George Lewis	80, Barkham Terrace, Lambeth, London, S.E.
Story, William	92, Upper Winchester Street, Caledonian Road, London, N.
Stretch, Joseph Harling	Douglas, Isle of Man.
Stringer, Charles	Hedon Road, Hull.
Stroud, William	3, Commercial Terrace, Herbert Road, Plumstead, London, S.E.
Sugden, Joseph William	7, Poultry, London, E.C.
Sumner, John Joshua	210, Camp Hill, Birmingham.
Swales, Joseph	Hadfield, Derbyshire.
Talbot, William John	8, Burdett Road, Limehouse, London, E.
Taylor, Frank	Pateley Bridge, Yorks.
Taylor, Richard Eccles	11, Gloucester Road, Birkdale, Southport.
Taylor, William	10, St. George's Terrace, Paisley Road, Glasgow.
Tharp, Arthur	29, Trinity House, Bath Terrace, Kennington, London, S.E.
Thistleton, Hugh	49, Adelphi Street, Preston.
Thomas, Joshua James	23, Alma Square, London, N.W.
Thompson, Anthony	46, Mary Street, Strangeways, Manchester.
*Thornton, John Barber	Lower Denmark Road, South Ashford, Kent.
Thwaites, John Charles	Wolverhampton.
Todd, George	Post Office, Houghton-le-Spring, Durham.
Tothill, John	70, Offord Road, Islington, London, N.
Turner, James	155, York Street, Heywood, Lancs.
Turner, John	Pitt Street, Warrington, Lancs.
Turner, William	64, Newborough Street, Scarborough.
*Twemlow, Francis Ernest	7, Albert Square, Stepney, London, E.
Uttley, William	60, Blackwell Street, Kidderminster.
Venables, Samuel Henry	42, High Street, Kington, Herefordshire.
Verdon, Levinous Henry	24, Lambeth Road, London, S.E.
Vickerman, Edwin	58, Spring Street, Hull.
Vincent, Henry Moore	1, Leiston Villas, St. John's Road, Croydon.
Walker, Joseph	11, Edwards Place, Leeds.
Walkington, William Marmaduke	318A, Nechell's Park Road, Birmingham.
Wall, Alfred	3, Queen Anne's Terrace, Bromley, Kent.
Wallis, Philip James	70, Burton Road, Brixton, London, S.W.
Ward, William Edwin	31, Belper Road, Hyson Green, Nottingham.
Warman, William Albert	167, Mare Street, Hackney, London, E.
Watson, George	54, High Street, Spennymoor, Durham.
Watterton, William	78, Wandsworth Road, London, S.W.
Weir, James Anthony	17, Duke Street, Newcastle-on-Tyne.
Welborn, Robert Walker	30, Mount Street, Grosvenor Square, London, W.
Welch, George Murray	63, Inverleith Row, Edinburgh.
*Wells, Edwin	Ludlow.
Whewell, Herbert	177, Handsworth New Road, Winson Green, Birmingham.
White, Joe	Bramley, near Leeds.
White, John Lewis	Bedford.
White, William Seager	Handsworth, Birmingham.
*Whyte, Alexander	65, Elizabeth Street, Eaton Square, London, S.W.
Williams, Frederick	9, Broad Street, Bath.
*Williams, George Henry	5, Bishopsgate Avenue, London, E.C.
*Williams, James Edward	5, Marquess Grove, Canonbury, London, N.
Wills, Charles	Richmond, Surrey.
Wilson, Ralph	41, Parliament Street, Stockton.
Wilton, George	9, Prince of Wales Road, London, N.W.
Winstanley, Alfred	308, West Street, Oldham.
Wood, Francis Wilson	4, Adelaide Place, Glossop Road, Sheffield.
Woodall, John	Neston, Cheshire.
Wright, Mark	34, Mount Ash Road, Upper Sydenham, London, S.E.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 17, 1888.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

RECTIFICATION OF THE REGISTER.

THE present number of the Journal contains a notice that is given by the Registrar under the Pharmacy Act, 1868, stating that letters of inquiry addressed to certain persons, in pursuance of the powers conferred upon him by the Statute for the rectification of the Register of Chemists and Druggists, asking for information as to their places of business, have either remained unanswered or been returned, and that consequently their names are liable to erasure from the Register on the 31st of December next. With this notice is published a list of the names and present registered addresses of the persons so situated, amounting in number to 343. The attention of Local Secretaries is also especially directed to this notice and to the list of names in order that they may take steps to prevent the inconvenience attending removal from the Register, by timely intimations to any of the persons named who may be known to them. Obviously it is, from every point of view, a matter of importance that a correct register of Chemists and Druggists should be kept, and to that end the Registrar has sent two registered letters at an interval of six months to each of the persons from whom information is required for the purpose. It is surprising, therefore, that there should still be such a large number of persons who fail to respond to these communications and thus expose themselves to possible future disadvantage. It may be that some of the number have ceased to carry on business for themselves; but, even in that case, it would be prudent to avoid being treated as if dead in the eye of the law, and removed from the Register. Their retirement from business may be only temporary, and though registration would not be absolutely necessary while engaged as assistants, it would become so in the event of their subsequently resuming business on their own account. For restoration to the Register in such a case a fine has to be paid and certain formalities have to be gone through, both of which necessities might be obviated by taking a little trouble to maintain the position of a registered individual. That position is, in fact, the only statutory privilege of a protective nature that the chemist and druggist can claim, and therefore it is remarkable that so little store should be set upon it now that there is so great a disposition to desire protection of some kind. Even under the exceptional conditions that obtain in regard to the carrying on of a chemist's business by stores and companies, the registered chemist has the advantage of being able to represent himself as a legally qualified man, and thus properly to place himself in contrast with competitors who have no such authority for carrying on business. That possibility is one which might be made serviceable if judiciously turned to account, and there is every reason to believe that if this were systematically done it would not fail to carry weight with the public, to the eventual advantage of those who have the right to make use of this criterion of technical trustworthiness.

THE USE OF METHYLATED SPIRIT IN MEDICINAL PREPARATIONS.

IN the case reported in last week's Journal Mr. SQUIRE, the counsel for the Inland Revenue Department, stated that the prohibition of the use of methylated spirit in preparing any article that could be consumed internally as a medicine, was introduced into the Spirits Act (43 and 44 Vict. 24), not only for the purpose of protecting the revenue derived from duty on spirits but also at the instigation of the Pharmaceutical Society for the protection of the public. A question has been raised as to the accuracy of the latter part of this statement, and as the circumstances relating to the matter are of somewhat remote occurrence it may be useful to recall them. After the passing of the Act in 1855, permitting methylated spirit to be used for manufacturing purposes free of duty, certain persons commenced making medicinal tinctures with methylated spirit, and the fact that such preparations were being publicly offered for sale was brought under the notice of an evening meeting of the Pharmaceutical Society in October, 1857. The practice was strongly condemned on that occasion, and Mr. JACOB BELL, the President at the time, brought the matter forward again at the following meeting. As a result of the discussion that took place, Mr. BELL was commissioned to communicate the fact to the College of Physicians for its decision as to the admissibility of the practice. At the Society's next meeting Mr. BELL stated that he had received a letter from Dr. HAWKINS, the Registrar of the College, to the effect that the censors declared their disapproval of the use of methylated in place of pure spirit in the manufacture of tinctures, as being an unauthorized departure from the instructions laid down in the Pharmacopœia. A similar minute of the Board of Censors was also forwarded to the Board of Inland Revenue, and in February, 1858, a letter was sent to the Council of the Pharmaceutical Society by the Board of Inland Revenue expressing a desire to

dissipate the impression that a departure from the rules of the Colleges of Physicians had been countenanced by the Legislature in regard to the use of methylated spirit, and giving a warning that the permission granted by that department conveyed no authority to apply methylated spirit in any manner not sanctioned by the Colleges of Physicians. Hence arose the subsequent specific legislative provision against the use of methylated spirit in the preparation of any article capable of being used internally as a medicine. This was embodied in the later consolidated Act of 1880, and it is therefore strictly correct, as stated by Mr. SQUIRE in the case above referred to, that this was originally done at the instigation of the Pharmaceutical Society.

BENTLEY TESTIMONIAL.

WE have been requested by Mr. PLOWMAN, the Treasurer of the above fund, to state that the following additional contributions have been received by him, and that the subscription list is now closed.

	£	s.	d.
Harold Woolley	5	5	0
From Melbourne, Australia.			
Joseph Bosisto, M.P., C.M.G.	1	1	0
E. C. J. Davies	0	10	6
George W. Francis	1	1	0
Rawson Parke Francis	1	1	0
E. Norton Grimwade	1	1	0
Thomas Huntsman	1	1	0
A. H. Jackson	2	2	0
W. M. Rowley	0	10	6
Harry Shillinglaw	1	1	0
H. T. Tompsitt	1	1	0

The proceedings at the Evening Meeting last Wednesday were more than ordinarily animated; but, apart from the matter of mere amusement, it may be questioned whether the disputation which took place between two of the Society's professors was not of a nature liable to be regarded as somewhat unseemly. So far as the subject in dispute is concerned it may be assumed that no one likely to test pharmaceutical preparations as to their purity would rely much for that purpose upon tests prescribed in the Pharmacopœia, and certainly no one competent for the work would seek enlightenment from that source. So far as experience goes a pharmacopœia test may be regarded more in the light of the mesh which is a measure of possible escape from the requisition of purity rather than anything else, and to that extent it may have commercial, though not scientific importance. It would, however, be unfortunate at the present moment, when the Pharmaceutical Society is making a laudable effort to be acknowledged as ranking with scientific societies, if any ground were furnished for objections to such recognition. Moreover, unity of action is not carried to such an extreme among pharmacists as to require moderation by an example of the opposite procedure on the part of leading lights in the pharmaceutical world.

* * *

We have much pleasure in recording the fact that the Conversazione of the Chemists' Assistants' Association, which took place at the Portman Rooms on Thursday evening, was, as usual, a most agreeable and successful reunion. In addition to the concert, which occupied the earlier part of the evening, there were a number of interesting exhibits collected for inspection by the guests, among which we may mention Wimshurst's electrical machines, sent by Messrs. J. J. Griffin and Sons; the electric light and miner's safety lamp, together with various apparatus for domestic use, lecture purposes, etc., shown by the Edison and Swan United Electric Light Company; the General Electric Company, Dr. Caplatzi, and the Electric Apparatus Company; electric models in motion, shown by the Climax Battery Company; and a collection of microscopes, with sections of animal tissue, lent by the Pharmaceutical Society and Professor Green. At the time of going to press we learnt that the dancing, which formed the latter portion of the programme for the evening, was about commencing, and was likely, with the stimulus of Fleet's band, to engage the guests until the small hours of next morning. The arrangements for the conversazione were carried out under the direction of the President, Mr. Millhouse, and Mr. Ellwood the Honorary Secretary, with the other members of the Committee, and they were in every respect deserving the highest commendation.

* * *

An Evening Meeting of the Pharmaceutical Society will be held at 36, York Place, Edinburgh, on Wednesday evening next, November 21, when an Inaugural Address will be delivered by Mr. William Gilmour.

* * *

In connection with the Universal Exhibition to be held in Paris next year it has been decided that there shall be a "collective scientific exposition" of French pharmacy. The exposition is intended to demonstrate to the public the services rendered to science by French pharmacists and the important part that the pharmacist is called upon to play in society. To illustrate this it is proposed to exhibit important medicinal compounds discovered in the pharmaceutical laboratory, such as quinine and digitalin, and other products presenting an agricultural or technical interest. In addition a catalogue is to be compiled of all the memoirs communicated to learned societies by French pharmacists, civil or military, since the commencement of the present century.

* * *

The opening meeting of the School of Pharmacy Students' Association will take place on Thursday, November 22, at 7 p.m., Professor Attfield in the chair. An Introductory Address will be delivered by Professor Dunstan, and the officers for the ensuing session will be elected.

* * *

The next meeting of the Chemists' Assistants' Association, which will be held on Thursday, November 22, will be devoted to the reading of "Short Papers by Members."

* * *

A meeting of the Midland Counties Chemists' Association will be held at the Mason College, Birmingham, on Tuesday evening, November 20, at 8.30 p.m., when some "Laboratory Notes" will be read by Mr. R. A. Cripps, and "Notes on Chloroform and Allied Substances," by Mr. A. E. Robinson.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN LONDON.

Wednesday, November 14, 1888.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The Second Evening Meeting in London of the session was held on Wednesday, the 14th inst., the Chair being taken by Mr. Michael Carteighe, President, at 8 o'clock.

The first paper read was a communication from the Research Laboratory, entitled—

CHEMICAL OBSERVATIONS ON TARTAR EMETIC.

BY PROFESSOR DUNSTAN AND MISS L. E. BOOLE.

The paper is printed at p. 385, and gave rise to the following discussion:—

The PRESIDENT said this was a very practical paper, and showed how much pharmacy must be indebted to chemistry in all matters affecting definite substances. Tartar emetic had been known almost from time immemorial, but its position had changed from time to time according to prevailing theories, and somehow or other the British Pharmacopœia seemed to have got a little mixed up about it. He congratulated the members on having for the first time a paper read there of which one of the authors was a lady.

Professor ATTFIELD said the first portion of the paper, the critical part, stated that the directions given in the British Pharmacopœia for the quantitative estimation of tartar emetic by the sulphur method required considerable amendment to render it of any service in practice. That was rather a hard thing to say of a process which had apparently done good service for many years, and which in its present slightly amended form had not hitherto met with any other objection. Of course he would not say that this or any official process required no amendment. Those responsible for the Pharmacopœia were always anxious to find means of amending or improving the processes. But it struck him that the authors went a little too far in what they stated. Next it was said that by this well-known process oxysalt was always deposited if acid were not previously added. That statement was probably correct, but when the inference was drawn that therefore the precipitate would ultimately weigh more than it ought to, he questioned it very much. If the process were properly conducted, although the oxysalt might be deposited when the sulphuretted hydrogen was first passed through, he doubted whether any such salt would remain in the precipitate at the close of the process. It was also stated that sulphur was necessarily present in the precipitated sulphide, and that also he questioned, for he had himself carefully examined the precipitate more than once for sulphur and failed to find any. Whether that was due to the fact that as soon as the sulphuretted hydrogen was passed through the solution it became acid he did not know, but his opinion was that there was no serious error in the result due to the inclusion of free sulphur in the sulphide of antimony. Then it was remarked that the sulphide of antimony was directed to be dried at a temperature of 100° C., and that at that temperature it would contain about 2 per cent. of water. He thought that was known to every analytical chemist. Fresenius himself said, not as the result of one experiment, but that it *always* contained about 2 per cent. of water, and that moisture was provided for in the figures given in the Pharmacopœia. Then the authors went on to say that the Pharmacopœia, instead of stating that the yield of sulphide should be 15·1 grains, should direct the yield to be only 14·67 grains. But were not the authors thus simply restating what had just previously been noticed, only putting it the other way? First they said that the precipitate contained moisture, and next that the figures for it were higher than the antimony warranted. Of course, the one followed from the other, and there being, according to Fresenius, always about 2 per cent. of moisture (in fact a little over 2 per cent.), the official statement followed, that if the substance was pure the result would be 15·1 grains. He certainly thought the authors were lacking in perception if they had not seen this; and if they had they might have mentioned it. He was glad to find that the formula in the Pharmacopœia was admitted to be correct, and did not think that in that book would be found the, in his opinion, unscientific formula—

$$SbOK{\cdot}C_4H_4O_6,\tfrac{1}{2}H_2O.$$

He would not say anything about the volumetric method, which was more or less familiar to him as Mohr's method. Possibly the authors had improved upon Mohr, but that would have to be seen. The question from the pharmaceutical point of view was whether it would work fairly well when used by pharmacists. It must be remembered that on the one hand it did not do to be too lax about a process; but, on the other hand, it was not desirable to use one which involved a great deal of troublesome manipulation, or the observance of a great many delicate points, if some other process, not perhaps quite so theoretically correct was more practically useful. He had been much interested in the experiments on the specific rotation of this substance, but whether that method could be easily adopted as a mode of testing was perhaps questionable; he should prefer the volumetric or even the sulphur method to one which required such very delicate and expensive apparatus. With regard to the condition of the commercial specimens it seemed that there was not much fault to be found; he had always understood that tartar emetic was liable to contain acid tartrate of potassium, and apparently it did so, but not to any very great extent. One would like to know how far the condition of most of these twelve specimens was duc to efflorescence and how far to the presence of acid tartrate of potassium. He hoped they would hear further details later on as to what was the effect of subjecting pure tartar emetic to the air, and to what extent and under what conditions it was then liable to loss of water. With reference to the use of the anhydrous salt in pharmacy he was not yet quite sure that such a change would be desirable. This recommendation was apparently based very largely on the examination of these twelve commercial specimens, but a better judgment would be formed by an examination of pure anhydrous and hydrous salts as to whether the former did or did not absorb moisture under varying conditions of the atmosphere, and the extent to which the hydrous salt gave up moisture. At present he should be inclined to say that it was better to bear the ills we have than fly to those we know not of.

Dr. INGLIS CLARK (Edinburgh) said he should leave the learned professors, who seemed to differ somewhat on this matter, to fight it out, though there were some points on both sides which struck him as being correct, and perhaps Professor Attfield had somewhat misunderstood Professor Dunstan on some points. He could not see, for instance, how efflorescence could have reduced the percentage in the way Professor Attfield had suggested; efflorescence would give a higher percentage.

Professor ATTFIELD said perhaps it had.

Dr. INGLIS CLARK said it might be also true that there was a larger percentage than was expected, but where the result of an examination of a specimen was given the potassium salt exactly corresponded to the amount there should be. He hoped that at some not far distant day some of thc lady members of the

Society would favour them in Edinburgh with a paper.

Mr. EKIN as a practical pharmacist wished to say a word on the recommendation to use tartar emetic in the form of a white powder. It was quite natural for Professor Dunstan to recommend a white powder of constant composition, but all practical pharmacists he thought would try to avoid the multiplication of white powders. They all preferred to keep such an article as strychnine, for instance, in crystals. He should be very sorry to go back from the old-fashioned, well-recognized crystals of tartar emetic. With regard to the volumetric process recommended, he was rather struck by the phrase "Now we have a process," but of course the addition of sodic carbonate was a well-known detail. With regard also to the latter part of it, in operations depending upon the reaction with iodide of starch, he must confess to considerable haziness. The only difference between the process now recommended and the one to be found in the text books, as far as he could make out, was that the authors said they waited for permanent coloration, whilst the one he referred to spoke of the momentary blue coloration. The momentary coloration was in practice a very difficult thing to bring about, and the permanent one was not much more satisfactory, because there was no such thing as permanence. The iodide of starch aggregated more quickly or slowly, as the case might be, and in his hands certainly it was not a very satisfactory method. The gradations were so fine that he did not believe any two observers always saw exactly the same thing.

Mr. MACEWAN remarked that a paper was read at the Aberdeen Conference on tartar emetic by Mr. Jackson, which created a considerable amount of astonishment at the time, some of the statements made being very alarming, the purity of commercial specimens in some cases being given as only 50 per cent. Mr. Jackson said he had obtained these specimens from drysalters, and Mr. Allen, Mr. John Williams, and others suggested that probably Mr. Jackson had got hold of the oxalate. Perhaps Professor Dunstan could give some opinion on that point. Further, the ordinary dispensing solution of tartar emetic generally deposited a white precipitate in the course of time, which he took to be oxide of antimony; and this point might be borne in mind in considering the advisability of adopting the anhydrous salt.

Mr. WALTER HILLS asked Professor Dunstan whether he took care that the anhydrous and hydrous salts were in the same condition of subdivision when he made his observations on their solubility.

Mr. WILLIAMS asked whether Professor Dunstan considered that in the incineration of tartar emetic, and treating it with fuming nitric acid, repeating that and treating the residue with water, the antimony would not be left and weighed as antimoniate, and whether the potassium would not go into solution as nitrate to be estimated in the usual way as potassium salt; if so, by that means the two estimations might be made simultaneously.

Mr. EKIN asked if there was any marked difference between the anhydrous salt as precipitated by alcohol from the powdered crystal, and tartar emetic dried in the ordinary way.

Professor DUNSTAN thought that Professor Attfield had made a very lame defence on behalf of the B.P. How was it possible to make a definite correction for an amount of impurity which was variable? In his opinion such a proceeding was entirely unjustifiable, and, as a chemist, he must protest against it. The statement of the Pharmacopœia was entirely misleading. It stated without qualification that if the directions were followed the orange precipitate, when washed and dried at 212°, would weigh 15·1 grains. The words "*nearly*" or "*about*" were not used here, although they occurred very frequently in other parts of the Pharmacopæia. But taking 14·67 and allowing for 2 per cent. of water, which was really only an approximate quantity, the corrected amount was 14·96 instead of 15·1 grains. He supposed the extra weight was intended to include the other impurities contained in the sulphide. Professor Attfield went on to say that every one was aware that this precipitate did not lose the whole of its moisture at 100° C. Then why was not this mentioned in the Pharmacopœia? Why was the pharmacist led to suppose that all the moisture was lost at 100° C.? There was no comment in any part of the Pharmacopœia on these numerous sources of inaccuracy.

Professor ATTFIELD remarked that the Pharmacopœia never made such comments. It was not an educational work.

Professor DUNSTAN said he considered that comment was necessary. Unless the directions given in the Pharmacopœia were sufficient to ensure an accurate result, they had better be omitted altogether. It was absurd to take exception, as Professor Attfield had done, to the formula which contained half a molecule of water. Atoms might be indivisible, molecules certainly were divisible, and on reference to almost any text book of chemistry, formulæ would be found in which fractions of molecules of water were included. He believed there was no objection, theoretical or practical, to the formula, having regard to the fact that the true molecular weight was unknown. With regard to the question touched upon by Dr. Inglis Clark, it was obvious that these high results could not have arisen from the presence of acid tartrate of potassium, and experiments narrated sufficiently showed that they were due to efflorescence. The question had been raised whether the anhydrous salt was stable. Professor Attfield looked upon the use of the hydrous or anhydrous salt as a choice of evils. The evil was certainly present in the one case; tartar emetic in the crystalline state contained water, which it lost when exposed to the air. On the other hand, it was known that anhydrous tartar emetic had no tendency to absorb water from the air, so that it was a perfectly stable salt. With reference to the process itself, he considered it could be conducted by pharmacists more readily than the volumetric estimation of arsenic, which certainly needed greater care. Dr. Attfield's defence of the Pharmacopœia reminded him of an anecdote of a manager of a chemical works, who, having engaged an analytical chemist, found that the analytical results came out in a very remarkable way. The analyst was therefore watched, and it was found that apparently he never weighed the watch glasses he used in his experiments. On being taxed with this omission, he replied that he thought it unnecessary to weigh every watch glass, since all watch glasses weighed about 2 grams. A similar assumption had been made in the Pharmacopœia. A correction was made for an error, which was in reality variable, but was assumed to be constant. With respect to Mr. Ekin's remarks, he might say that the commercial specimens were invariably in powder; out of the twelve specimens only two were in the form of fairly large crystals.

Mr. EKIN said he was not in the habit of seeing commercial specimens in the form of powder, as supplied to pharmacists. Perhaps the pharmacists powdered it themselves.

Professor DUNSTAN said he thought it was not at all improbable that changes might take place more readily when the crystals were powdered. It did not occur to him that this was an objection to the anhydrous salt, because he was in the habit of seeing commercial crystals in powder. They did not claim the iodine method as new. As was stated in the paper it was originally put forward by Mohr, and on his recom-

mendation was copied into many text books, but Fresenius, who had examined the method, obtained results which were certainly not satisfactory, and it was this which led to the present investigation being made. They had proved that under certain conditions the method was capable of yielding perfectly accurate results, which could not have been said of the method before. No difficulty was found in taking the readings by means of starch indications. Mr. MacEwan had referred to Mr. Jackson's results, which he had refrained from doing, because he thought it was clear that Mr. Jackson had examined not tartar emetic, but probably a double oxalate of antimony and potassium. With reference to Mr. Williams's question as to the method of igniting tartar emetic, oxidising with nitric acid and washing out the potassium salt, he was inclined to doubt whether it would be successful, because it was very difficult to ignite oxide of antimony without a little loss taking place; it was also difficult to wash out the whole of the potassium from the residue. Professor Attfield might be interested to know that since the paper was written they had made a very careful trial of the B.P. process, working under exactly the conditions there mentioned, and obtained as a result 19 grs. instead of 15·1. The principal source of error arose from the precipitation of acid tartrate of potassium, for the entire removal of which a prolonged washing was necessary, but the necessity for this precaution is not alluded to in the directions given in the Pharmacopœia. No difficulty would be found in titrating tartar emetic in the way which was now proposed, but if any were found by subsequent experimenters he would be glad to hear of them. They had given the method a long trial in the laboratory, and had every reason to be satisfied with the results they had obtained.

The PRESIDENT in proposing a vote of thanks to the authors congratulated them, and particularly Miss Boole, on having brought forward the record of a great deal of very careful work, the result of which would be, no doubt, that the compilers of the Pharmacopœia would make some further experiments before inserting directions for testing the purity of tartar emetic in the next edition. No doubt Professor Attfield had made a very good defence of the Pharmacopœia, but he could not help thinking that the process had not been tried sufficiently often before that book was published. He did not know whether Professor Attfield had tried it.

Professor ATTFIELD: Yes, and many others.

The PRESIDENT said he was sorry to hear it, because twenty-five years ago, when at work at University College, students were always warned against that process if anything like reasonable accuracy in determination were required, and he should have thought the combined skill of the Emeritus Professor and Professor Attfield would have been sufficient to have devised a process which would be more accurate and probably easier.

Professor ATTFIELD asked leave to reply to the fresh question raised by the President. It had been well known to chemists before his time that these processes of estimation of sulphides were unsatisfactory, but there were right and wrong ways of going to work to estimate any one of the substances, arsenium, antimony, etc., in the form of sulphides. He had heard wrong ways described, and he was bound to say that the Pharmacopœia direction for the estimation of antimony in tartar emetic as sulphide did not include all the minutiæ which would command success, and that remark might be extended to other processes. But then the Pharmacopœia was not an educational work; it assumed all the way through that those who worked by it had a reasonable amount of chemical knowledge and skill, and knew how to wash sulphides and to prevent their decomposing and the presence of an undue quantity of sulphur in them. Fresenius himself still gave the process and alluded to the about 2 per cent. of water. If persons having proper knowledge used that sulphide method they would find that they would get far nearer to proper results than Professor Dunstan did when he got something like 19 grains instead of 15. Far be it however for him to say that no better process could be described, or that this volumetric process was not a better one. He fervently hoped and believed that it was, and if it should turn out to be a better process, it would most certainly displace the present one in the Pharmacopœia.

The next paper read was entitled—

NOTES ON TWO RESINS USED BY THE ANCIENT EGYPTIANS.

BY E. M. HOLMES, F.L.S.

The paper will be found on p. 387.

At the conclusion of the reading of the paper Mr. Holmes said that Mr. Newberry, from whom he had received one of the resins, was present, and had brought with him some interesting drawings that had a bearing upon the subject.

Upon the invitation of the PRESIDENT,

Mr. PERCY E. NEWBERRY said: I merely wish to point out the light which is thrown upon the subject of resins by the monumental inscriptions of ancient Egypt. With regard to the myrrh the hieroglyphic inscriptions have much to say. There is, for instance, at Deir el Bahari an inscription which records an expedition to the balsam land of *Punt* (the modern Somali-country), undertaken by Hatasu, a queen of the XVIIIth dynasty (she lived about 1700 years B.C.). Through this expedition, we learn from the inscriptions, "31 verdant myrrh trees" were introduced into Egypt, besides a large quantity of myrrh resin. In this drawing [drawing shown], which is taken from the walls of Hatasu's temple at Deir el Bahari, we see a representation of the myrrh trees planted in wooden tubs and heaps of the resin, which are recorded as having been "brought over the ocean to Egypt." The inscriptions which refer to these trees give very exactly the place from whence they came. They were, we are told, "brought over the sea in ships from the incense *mountains* of the Somali country." These mountains, we are further told, formed the "best district of the incense-land." At the present day, I believe, these mountains are still famous for their myrrh. In this other drawing, which is also taken from the Deir el Bahari monument, may be seen a figure of one of these incense trees in the original size in which they are represented on the monument. It shows a medium-sized tree, with somewhat thick trunk and spreading branches. The leaves are oval, and appear to terminate in an acute point. There is also shown, exuding from the stem in the form of tears, a gum-resin, which in the original is coloured red. This drawing, made nearly 3600 years ago, represents roughly the myrrh tree, the *Balsamodendron Myrrhi* of Nees. Myrrh, however, was not only imported into Egypt in ancient times from the Somali country, it was also imported from the island of Socotra and from Arabia. An inscription on the walls of Thothmes III.'s temple at Karnak (erected about 1600 B.C) records an expedition undertaken by that king to this island, for the purpose, it is related, of introducing "all the beautiful plants of that country." Many of the plants are figured on the walls of the Karnak temple, and among them is undoubtedly one which represents the myrrh tree. With regard to the myrrh being imported from Arabia, there is a sentence in the Papyrus Harris (written in the time of Rameses III., about 1250 B.C.), which records that Rameses "lend to the temple of Amen-Ra at Thebes, Arabia, with all its fragrance," including myrrh trees, which are said to have been "planted in its front." Several hieroglyphic inscriptions of a much later date also record that myrrh was exported from Arabia. With

regard to the Chian turpentine which Mr. Holmes thinks to have been exported from Greece, I may say that, from an historical point of view, nothing is more probable. The jar of resin, as Mr. Holmes has said, was found on the ruined site of Naucratis, and dates from the sixth century B.C. At that time Naucratis was a Greek colony, indeed the only Greek colony, in Egypt. Many other things undoubtedly exported from Greece were also found on the same site.

The PRESIDENT proposed a vote of thanks to Mr. Holmes and to Mr. Newberry, which was carried unanimously.

Mr. EKIN suggested that one should not lay too much stress on the names of gums and resins met with in Ecclesiasticus, because obviously they must depend entirely on the botanical knowledge of the translators, which was not very exact.

Mr. HOLMES said this remark was perfectly true, and gave one or two instances of mistakes of this kind.

MODELS OF CRYSTALS.

Professor DUNSTAN drew attention to a book on 'Crystal Models,' presented by Mr. Gorham, containing instructions for the making of models of crystals out of paper and cambric. It was well known to those who had studied crystallography that it was very difficult to get models at a reasonable cost. The Society was the fortunate possessor of some models designed by Richard Phillips and executed by Laudin, but they were extremely expensive. Mr. Gorham, who commenced working on the subject more than forty years ago, had devised a plan of constructing these models by plaiting paper backed with cambric, several specimens of which were exhibited, and he believed the method was thoroughly described in the book which had been presented.

The PRESIDENT moved a vote of thanks to Mr. Gorham, and said no doubt students would be very glad to have facilities with regard to the subject of crystallography, which was not a popular one, though he feared a great deal of its unpopularity was due to the fact that men had not sufficient mathematical knowledge to begin with, whilst until recently the subject had been taught in a very dry and uninteresting way.

A MICROSCOPE LAMP.

Mr. CHRISTY then drew attention to a lamp for microscopic purposes. It appeared to be an ordinary paraffin lamp, with a metal cone surrounding the china. On one side of the cone was an aperture from which proceeded a solid glass rod, along which a portion of the light from the lamp was reflected and focussed at the end. When in use the end of the glass rod was brought under the stage of the microscope in the place of the ordinary reflector. Mr. Christy said he had met with this contrivance while at the recent meeting of physicians at Cologne, where it attracted great attention. On applying to Mr. Cetti to make him the glass tube, he had been told that it was the subject of a patent, but on inquiry at the Patent Office he found that while it was quite true that a patent was taken out in 1884, it had since been abandoned, so that any one who wished could make these simple lamps. They had also been very much appreciated in Paris, where it was pointed out that several tubes could be carried from one lamp.

DONATIONS TO THE MUSEUM.

Mr. HOLMES then called attention to several specimens of interest, of which the following were the principal. Two specimens of the asafœtida plant: one had flowered at Kew this year and was *Ferula narthex*, and the other had recently flowered in the Moscow Botanical Gardens, and was the *F. fœtidissima*, a species discovered within the last two or three years in Turkestan, differing from the former in having distinctly serrate leaves. The specimen of caffeine was some of the first that had been made from denatured tea in this country. Some large crystals, sent by Mr. Stephenson, of Glasgow, of bichromate of sodium, which differed from the bichromate of potassium in being decidedly deliquescent. There were also a number of botanical specimens of Indian medicinal plants, presented by Mr. Prebble, of Bombay. The materials from which the arrow poison of Borneo is prepared had been presented by the Director of Kew Gardens for the purpose of investigation. The sperm oil, presented by Mr. Umney, represented the condition in which it was taken direct from the whale, before being separated into spermaceti and sperm oil. The arrowroot made in India was a tentative one prepared at Gondal, in India, as an experiment. It resembled in microscopical character Natal arrowroot. A curious specimen, sent by Mr. Wilson, of a remarkable plant which grows in a caterpillar in China, and is used there in medicine. The drug had been described by Dr. Pereira many years ago in the *Pharmaceutical Journal* (vol. ii., p. 591). Some of the dried caterpillars were shown in bundles, as used by the Chinese at Singapore. These came from the Colonial Exhibition. The specimens of false ipecacuanha recently in commerce had been identified as the rhizomes of *Lagenandra toxicaria*. He had, however, written to India concerning it, and Professor Lawson, of Ootacamund, suggested that it was derived from *Cryptocoryma spiralis*. On comparing it with specimens in the British Museum and at Kew, he found the roots of the specimens in the Museum of *Lagenandra lancifolia* were much nearer to it than those of Cryptocoryma. But it was possible that in different parts of India different plants were used. Some thirty years ago Dr. Hanbury described a peculiar kind of salep under the name of royal salep (*Pharm. Journ.*, [1], xvii., 499), (of which a specimen was shown) and could not identify the drug, but supposed it to be the root of a kind of *Tulipa*. Professor Bentley suggested it was most probably an *Allium*, and the latter suggestion had turned out ultimately to be the correct one; it had now been identified as the *Allium Macleanii* by Dr. J. E. T. Aitchison, F.R.S., who had kindly sent the fresh bulb exhibited. Some spurious colocynth, smaller in size than the true variety, and containing hardly any pulp, had recently been imported into this country. The aloe leaves and flowers had been sent by Mr. Watt of Montserrat in reply to an inquiry if the plant used for Curaçoa aloes was different from that used in making Barbadoes aloes. Difference in colour in different specimens of Barbadoes aloes was largely due to the manner in which the drug was prepared. The juice was not evaporated until about 50 gallons had been collected, and if smaller quantities of the juice were kept some time before being evaporated the aloes became dark coloured; whereas if sufficient were collected to begin evaporation at once, the product was of a lighter and brighter colour. Some samples of gum from Benguela in Africa, which seemed of good quality, except for its dark colour. A sample of senega consisting largely of the stem and not of the root. Several barks, representing the fragrant massoi bark of Eastern commerce.

The PRESIDENT proposed a vote of thanks to Mr. Holmes, which concluded the proceedings.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 7th inst.

Present—The President, Mr. James E. Brunker, M.A., in the chair. Vice-President (Mr. Draper), Dr. Collins, Dr. Montgomery, Mr. Allen, Mr. Charles Evans, Mr. P. Merrin, Mr. Wells, Mr. Doran, Professor Tichborne,

Mr. Begg, Mr. McCormack, Mr. Hayes and Mr. Simpson.

A letter was received from Dr. John W. Moore, the Registrar of the King and Queen's College of Physicians, acknowledging the receipt of a letter from the Council of October 6, transmitting a memorial in favour of the inclusion of carbolic acid in the schedule of poisons in the Poisons Act, and stating that the letter would be laid before the College at an early date.

A letter was read from the Pharmaceutical Society of Australasia, acknowledging the receipt of a copy of the Calendar of the Society; and a letter was read from the Royal College of Surgeons of Ireland acknowledging a similar donation.

A letter was read from Mr. J. E. Connor, of Hill Street, Newry, asking to be allowed to present himself at the Society's examination for the licence on April 3, 1889. He stated that that date would be a few (three) days within the prescribed two years; but he was a registered medical student, and had passed the matriculation examination in Edinburgh on April 7, 8 and 9, 1887; and he was anxious to qualify as a pharmacist as soon as possible.

The President: I think it would be rather hard to throw him back three months for only four days.

Professor Tichborne: We allowed a similar application recently.

The President: Yes, in which the applicant was three days within the time.

Mr. Connor's application was granted.

The Council then considered in committee applications from Mr. James Mellor, Mr. John Black and Mr. W. R. Beck, in reference to certificates in practical pharmacy which they solicited the Council to accept. Orders were made thereon.

A letter was read from Mr. J. C. C. Payne, of the Medical Hall, Belfast, expressing his thanks to the Council for their letter and resolution, conveying their regret at his resignation.

On the motion of Mr. Evans, seconded by Mr. Allen, the following resolution was passed unanimously:—

"That the letter conveying the resolution of the Council to Mr. Payne regretting his resignation be sealed with the seal of the Society."

A donation was received from the Mason Science College, Birmingham, of a copy of their Calendar for 1888–9.

On the motion of the Vice-President, seconded by Dr. Collins, thanks were voted to the College for the donation.

The President laid on the table the reports of the Examiners, and mentioned that at the examination for the licence, out of nine candidates five passed, four of whom gained very good marks, and one making 93 per cent. in botany and materia medica. At the Preliminary Examination, there were eight candidates, of whom five passed.

On the motion of Mr. Allen, seconded by Mr. Evans, the licences for the candidates who had passed the final examination were ordered to be sealed.

Professor Tichborne submitted the following resolution:—

"That having regard to a statement made that the Pharmacy Bill (Ireland) will be put before a Select Committee of the Lower House, it is desirable that a Committee of this Council be appointed to consider what amendments might be accepted; and that a special meeting of the Council be summoned by the President to consider the report of said Committee, if it is thought desirable, before the 14th instant."

The Council went into committee on the above resolution, and in the result the following resolution was reported as having been passed by the Committee:—

Moved by Mr. Hayes and seconded by Mr. Wells—

"That this Council has full confidence in their President, and request that he and Mr. Allen will proceed to London at the expense of the Society to watch the progress of the Bill."

On the motion of Mr. Hayes, seconded by Mr. Simpson, the following gentlemen were elected Examiners for 1889:—Dr. H. C. Tweedy, M.D.; Dr. W. Whitla, M.D.; and Mr. H. C. Draper, F.C.S.

On the motion of Mr. Hodgson, the Treasurer, seconded by the President, Mr. Robert Duggan, L.P.S.I., of Summer-hill, Dublin, was elected a member of the Society.

Three other licentiates having been nominated for membership, and some other business having been disposed of, the Council adjourned.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

The first meeting of the Chemical Society for the present session was held on Thursday, November 1, Mr. W. Crookes, F.R.S., President, in the chair.

The following papers were read:—

The Constitution of the Terpenes and of Benzene. By WILLIAM A. TILDEN, D.Sc., F.R.S. With the object of testing further the current hypothesis concerning the constitution of the terpenes, the author has made a series of quantitative estimations of the amount of paratoluic acid produced by the oxidation of several of the terpenes with dilute nitric acid in comparison with the amount of the same product formed under the same conditions, from cymene and from paraxylene. The following results were obtained:—

100 parts by weight give of paratoluic acid—

Cymene (from terpentine)	80·1
Cymene (from cumin oil).	73·1
Paraxylene (Kahlbaum's).	77·2
Australene from American turpentine .	1·2
Terebenthene from French turpentine .	1·9
Hesperidene from orange oil	0·0
Dipentine from ($C_{10}H_{16}$·2HCl) obtained from terpin	27·6

An experiment on a larger scale with hesperidene showed that the chief product of its oxidation by nitric acid is oxalic acid: using chromic acid mixture, Wright and Beckett found that acetic acid was the only product. The characteristic properties of the terpenes as a class,—the readiness with which they polymerise by heat or contact with a small quantity of sulphuric acid, the eagerness with which they combine with bromine, with hydracids, and in some cases with the elements of water, and the nature of their products of oxidation, are such that they differ wholly from all known benzenoid hydrocarbons. In order to settle the limit of the combining capacity of the chief terpenes about which there is some difference of statement on the part of different authors, the amount of bromine taken up by the hydrocarbon was determined. From the several experiments made in each case the following numbers were deduced. One hundred and thirty-six parts or 1 mol. proportion of the hydrocarbon combine with the following quantities of bromine.

Australene	313
Terebenthene	307
Hesperidene	322
Dipentene (terpilene)	297

Calculated for Br_2, 160; for 2 Br_2, 320. In all cases the hydrocarbon unites with 4 atoms of bromine and no more. Camphene does not combine with bromine and hence must be regarded as saturated in the usual sense. Since the terpenes possess at most four units of available combining capacity, the nucleus of 3 carbon-atoms, which they all undoubtedly contain, cannot be supposed to form an open chain. They must be united into a closed chain containing at the most two

double bonds. Hence formulæ of the character of those proposed originally by Oppenheim, and later by Goldschmidt and Zurrer, by Wallach and Brühl, are the most probable. Such formulæ represent the molecule as constructed upon the basis of a ring of 6 carbon-atoms disposed in the manner which has been so long familiar in Kekulé's formula for benzene. But since the terpenes are certainly not benzene-derivatives, Kekulé's formula must be abandoned. The evidence in support of this conclusion is not derived solely from the foregoing considerations; which standing alone would probably be regarded as inconclusive. The chief objection which has been urged against Kekulé's formula is based upon the difference in the nature of the link between the carbons which stand in the relative positions 1 : 2 and 1 : 6. The hypothesis devised by Kekulé himself to meet this difficulty cannot be regarded as satisfactory. Another objection to the symbol is that benzene is represented as containing "ethylenic" carbon, for which there is no evidence at all; moreover a body of this formula when treated with nitric acid ought to yield abundance of oxalic acid; this the terpenes do, but the benzenoid hydrocarbons do not. The characteristics of the benzenoid hydrocarbons and their derivatives may be explained by the formulæ proposed by Claus, by Ladenburg, and by Armstrong and von Baeyer, but at present there is not sufficient evidence to enable us to decide between them. As to the terpenes, the conclusions derived from their refraction equivalents are so much at variance with the chemical behaviour of many members of the group, that they cannot be accepted without considerable qualification. Such other physical evidence as is deducible from the work of Hartley, and of Abney and Festing, tells entirely against the assumption that the terpenes are derivatives of benzene.

Referring to Professor Tilden's statement that it was an objection to Kekulé's formula that benzene did not yield oxalic acid on oxidation, Dr. Japp said that phenol, he believed, gave a considerable quantity of the acid on oxidation with alkaline permanganate.

Mr. Groves added that oxalic acid was obtained in quantity on oxidation of chloranilic acid; and Dr. Perkin remarked that he had obtained a quantity of oxalic acid in preparing picric acid from phenol.

Dr. Perkin said that the magnetic rotatory power of American turpentine was remarkably low, which was a probable indication of the non-existence of a C_6 nucleus.

Dr. Armstrong expressed the opinion that the evidence at disposal was entirely insufficient to enable us to determine the constitution of the terpenes with any degree of probability. He could not accept Dr. Tilden's conclusion that camphene was saturated, as it readily united with a molecular proportion of hydrogen chloride. With regard to the constitution of benzene, his main contention was that the cross connection of carbon-atoms exhibited in Claus's and similar formulæ was inconceivable; he believed that corresponding carbon-atoms could exercise an influence upon each other although unconnected except indirectly.

Professor Tilden said that his chief object in referring to the constitution of benzene was to emphasize his opinion that whatever the nature of the combination between the carbon-atoms, it did not correspond to that which obtained in ethylene.

Some new Compounds of Magnesia with the Halogens: a Contribution to the Study of the Electrolysis of Magnesium Chloride Solution. By C. F. Cross and E. J. Bevan. Observations upon the electrolysis of magnesium chloride in aqueous solution, which is now a process of preparing bleaching solutions on the large scale, had previously made the authors aware that the decomposition was attended by interactions *not* to be explained on the view commonly held, viz., that the ions are magnesium and chlorine, which by secondary interactions give rise to magnesia and hypochlorous acid. With the view of elucidating the actual mechanism of the electrolysis the authors have studied in the first instance the phenomena at the cathode. The white substance separated under the condition that the solution is not kept in circulation, is not magnesia (hydrate), but a chloroxygen-compound of magnesium, in which the ratio of Cl to total oxidising power expressed as Cl is approximately 1 : 2. It may be regarded, therefore, as a magnesium hypochlorite. It is worthy of note that the percentage weight of "total oxidising Cl" lies between 30 and 35, calculated on the anhydrous substance. The compounds described were analysed in the freshly prepared and hydrated condition. They differ from the normal magnesium hypochlorite not only in being insoluble, but also in point of their stability. Similar compounds were obtained on electrolysing solutions of magnesium bromide and magnesium iodide, though in the case of the latter the ratio—Total oxidising iodine : Iodine as silver iodine—is considerably less than 2, viz., approximately 6 : 5. Nevertheless, the compound decomposes ammonia with evolution of nitrogen, and is in all its properties rather a compound than a mixture of iodine with magnesia. The authors are engaged in studying the phenomena to be observed at the anode during the electrolysis in question, and the composition of the resulting solution in regard to the whole of the chloroxygen-compounds, of which there appear to be at least two.

The Heat of Dissolution of Various Substances in Different Liquids. By S. U. Pickering. The author has explained the constancy of the heat of neutralization of acids by alkalies on the view that the affinity of the radicles composing the salt molecules concerned is not entirely saturated by their combination, and that the residual affinity of one of these radicles becomes in each case entirely saturated by the solvent. The heat of combination of the atoms, and the heat of dissolution of the molecules which they form, are thus parts of the same operation, and must, therefore, both be chemical in their nature. Dr. Nicol has suggested the possibility of the heat of dissolution of the molecules of four solids showing the relation expressed by $MR_1aq - M'R_1aq = MR'_1aq - M'R'_1aq$, which would render the above-mentioned connection between the heat of dissolution and formation of the molecules unnecessary. The author shows that if Dr. Nicol's suggestion held good a certain relationship would obtain between the heat of dissolution of two pairs of salts in two different liquids. To investigate this he has determined the heat of dissolution of the nitrates and chlorides of calcium and lithium in water and in alcohol, and has found that they give results showing a difference of 4461 cal. where, according to Dr. Nicol's view, there should be no difference at all. Other salts were also examined, with the result that the heat of dissolution in alcohol was sometimes greater and sometimes less than in water. According to the author's views the heat of dissolution should be the same whatever the solvent, provided (1) that the residual affinity of one only of the radicles constituting the dissolved substance be saturated by the solvent, and (2) that the saturation be effected by *free* affinity of the solvent, *i.e.*, that no alteration in the force with which the molecules or atoms of the solvent are united together be involved. The first condition is ensured by taking an elementary substance instead of a salt; and the author has found that the heats of dissolution of iodine and bromine in various liquids give much more nearly identical results than salts do, and that with liquids containing no oxygen the results are identical within experimental error. Oxygenated liquids give higher results, and the presence of sulphur as a constituent element of the solvent has, to a certain extent, the same effect as oxygen. If the second

as well as the first above-mentioned conditions could be secured, the results would probably be in all cases identical?

Professor Ramsay said it appeared that the heats of dissolution of iodine in various media might be arranged in two well-defined groups. Might not this be correlated with the fact that iodine dissolves in certain liquids forming a brown solution and in others forming a violet solution; and with the observation recently made by Loeb that iodine existed in three differently coloured solutions in different molecular states.

The Criteria of Plane and Axial Symmetry. By HENRY E. ARMSTRONG.

Derivatives of Methylindole. By H. G. COLMAN, Ph.D., B.Sc.

Acetamide and Phenanthraquinone. By ARTHUR T. MASON, Ph.D., F.I.C.

The Action of Ethylenediamine on Succinic Acid. By ARTHUR T. MASON, Ph.D., F.I.C.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the Chemists' Assistants' Association was held on Thursday, November 8, at 103, Great Russell Street, Mr. E. J. Millard, President, in the chair. The minutes of the previous meeting having been read and confirmed, and several new members proposed, the President called on Mr. A. W. Stokes to read a paper entitled, "The Adulterations of the Breakfast Table."

Mr. Stokes first pointed out that water is an important natural constituent common to all the articles of food ordinarily met with at the breakfast table, and then proceeded to deal with these substances seriatim. The composition of butter fat was described, and the methods of detecting the presence of foreign admixtures. Next in order, tea, coffee and cocoa were dealt with, and afterwards came milk, sugar, condiments, jams, etc. In each case the general characters of the genuine article were described, and then the means adopted by analysts for detecting adulterants, these being illustrated by chemical and microscopical demonstrations.

The reading of the paper was followed by a discussion, initiated by the President, and continued by Messrs. Bird and Strother. After which a hearty vote of thanks was accorded to Mr. Stokes, on the motion of Mr. Dymond, seconded by Mr. McDiarmid.

Provincial Transactions.

YORK CHEMISTS' ASSOCIATION.

The following passages are taken from a report which has been drawn up by a committee at the request of the annual meeting of the York Chemists' Association, held on October 1:—

"The affairs of the Association are in an eminent degree flourishing and in every respect satisfactory, and, indeed, financially we are better situated than at any previous time in our history. It is very gratifying to find that the efforts put forth to revive an institution so useful to the trade, have been crowned with complete success.

"The cash received in subscriptions amounts to £7 15*s.* 6*d.*, and from students for attending classes we received £2 12*s.* 6*d.*, making a total income of £10 12*s.* The expenditure up to November 1 amounts to £5 1*s.* 2*d.*, thus leaving in the Treasurer's hands a balance of £5 10*s.* 10*d.* Having commenced without anything in hand we have reason to be gratified with this result.

"Owing to our inability to secure a room suitable for practical chemistry, the sum left in Mr. Sowray's hands since the Conference met in York, has not been encroached upon.

"Since the last annual meeting held in October, 1887, the headquarters of the Society have been removed from the Y.M.C.A. rooms, to 19, High Ousgate, a more comfortable and better room for our purposes having been secured for a smaller rent.

"The Committee have investigated several cases of alleged infringement of the Pharmacy Act, and these on being reported were dealt with in a proper manner by the Pharmaceutical Council. This being our chief *raison d'être*, we shall continue to use the utmost vigilance in protecting the interests of the trade, and suppressing any illegal encroachments on our rights.

"Apprentices and assistants, on payment of a small fee, may have access to a valuable library of books of pharmaceutical interest, a collection of dried botanical specimens, a collection of autograph prescriptions, and a very complete collection of specimens of materia medica, comprising not only the official drugs, but many examples of substitutes and adulterants, in addition to such classes as the Committee may be able to arrange during the winter months."

Review.

SOAPS AND CANDLES. Edited by JAMES CAMERON, F.I.C., Analyst in the Laboratory, Somerset House.*

This book forms one in the series of Technological Handbooks published by Messrs. Churchill, and will be found extremely useful by anyone wishing to acquire a *practical* knowledge of the manufacture of these articles. It is a compilation from all accessible sources of the literature descriptive of the making of soap and candles, and is plentifully illustrated with engravings of the machinery employed in the various operations. About two-thirds of the book is devoted to soap, and comprises its history and properties, the materials used in the manufacture and their preparation, a brief account of the theory and principles of saponification, a full description of the apparatus and the arrangement of the factory, and the actual details of the manufacture of the different varieties of soap. These are classed as Household, Toilet, and Soft Soaps, together with medicinal and industrial varieties, and plenty of working formulæ are given for each class, the details of each operation being also gone into sufficiently to render the description a good practical guide.

The chapter on medicinal soaps contains a full extract from Dechan's investigation of pharmaceutical soaps (*Pharm. Journ.*, April 25, 1885), as well as several formulæ from the 'Year Book of Pharmacy;' other recent work, such as that of Wright and Thompson, has also furnished information which has been made use of. Useful tables of saponification equivalents for different oils and fats are also included.

The other section gives a complete description of candle-making, from the tallow dip to the ornamental wax candle, and first of all describes the sources of and methods of refining the substances used. The processes of refining paraffin, and of separating the glycerine from fats, are of general as well as technical interest, and are explained in detail. Several tables of percentages and other statistics are contained in a short appendix.

The whole is compiled in a very practical manner, and the excellent illustrations of each piece of machinery mentioned make it thoroughly clear and comprehensible.

BOOKS RECEIVED.

THE MINERAL WATER AND BATHS OF ASHBY-DE-LA-ZOUCH. By CHARLES R. WILLIAMS, M.B., M.C. Edin., Consulting Physician to the Baths Company and Medical Officer of Health for Ashby-de-la Zouch.

* London: J. and A. Churchill, 11, New Burlington Street.

LEHRBUCH DER PHARMAKOGNOSIE. Von Dr. JOS. MOELLER. Vienna: A. Hölder. 1889. From the Author.

ANGEWANDTE PFLANZENANATOMIE. Ein Handbuch zum Studium des anatomischen Baues der in der Pharmacie, den Gewerben, der Landwirthschaft und dem Haushalte benutzten pflanzlichen Rohstoffe. Erster Band: Grundriss der Anatomie. Von D. A. Tschirch. Vienna and Leipzig: Urban and Schwarzenberg. 1889. From the Publishers.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

POISON REGULATIONS.

Sir,—When in October I gave notice at the meeting of the Pharmaceutical Council of my intention to move in November a resolution to the effect that "This Council reconsiders the question of recommending to the members of the Society the desirability of adopting and submitting to the Privy Council for approval some regulations for keeping and selling or dispensing poisons as required by the Pharmacy Act, 1868," I proceeded in a manner quite constitutional and regular (although this was challenged at the time), adding that I did so with a view of ascertaining the opinion of the trade on the matter, so as to assist the Council in its deliberations when the subject came to be considered.

It would have been out of order to have spoken further to the notice, therefore any details of my views on the matter could not then be given. I thought it quite possible that by a few persons my motives may have been misunderstood. But when a week later I went to Sheffield (which eighteen years ago was a centre of opposition to regulations) to assist in inaugurating a new session, and found myself treated with such kindness and confidence as I am pleased here to acknowledge, it gave me every hope that the subject would be considered on all hands in its broadest light; and by the trade generally, so far as it has been considered at all, the tendency has been in this direction. At the Liverpool meeting I hesitated to say much, because I had to bring the matter more fully before the Pharmaceutical Council ten days later, but I stated distinctly that there was no wish on my part to coerce chemists into adopting regulations, but that when the matter was laid before them they should reason it out for themselves. The meeting was fairly well attended, was a representative one, and at it an unanimous vote in support of "regulations" was carried. No result of an opposite kind appears to have been arrived at by any meeting held elsewhere; there have been no demonstrations against them.

Then as to the correspondence, it has not been large, it has been very fair, the old arguments have been revived, and the balance of opinion so far is against me. Some have thought it unwise to revive the question now, but there has been a marked absence of that vituperative and controversial feeling which obtained many years ago. There has been a general willingness to reconsider the matter, and it was naturally expected that I should be able to show some good reasons for my proposal to do so, and this is all I desired. I had not been "got at" by any Government official or anyone else, had no hobby to pursue, no personal advantage to gain. Like some 13,000 other chemists in Great Britain I believed that the Pharmacy Act as now construed and administered had proved a failure, and also that the incidence of some other laws were unjust towards us. As a member of Council and Local Secretary I had observed and ascertained by inquiry that a large amount of suffering resulted to the members of our craft from this state of things, and naturally the question had many times presented itself to my mind, Can nothing be done to remedy this state of things?

Now this is not an easy question to answer, and I am not so sanguine as to suppose that we can get all we wish for; but I do earnestly believe that something can be done to amelioriate our condition and improve our environment. There may be differences of opinion as to how such an undertaking should be commenced, but surely it is one in which we are all interested, and in which we could all pull together with a will and with an unanimity such as has been rarely experienced. Rightly or wrongly we are not in good favour at the Privy Council Office, and I had thought that all may be prepared to make some little sacrifice (if such it be) to set ourselves right with the Government as a preparatory step, but the wisdom of so doing was open to discussion amicably. I knew, however, it was a somewhat delicate matter, and accepted personally the responsibility of bringing it forward in what I believed to be a proper and systematic manner. Any blame, therefore, which attaches to so doing belongs to me alone, and the Council as a body is in no way responsible.

By Wednesday morning the President and several members of Council who had spoken to me on the matter were made aware of the fact that I was desirous of placing it before them in anything but a contentious spirit, and that I felt it was due to the members of the Society, and our friends outside, that after raising the matter I should give them my reasons for so doing. It will readily be conceived that after this I was nonplussed at the resolution for going into committee, and had I proceeded with the matter in secret it could not now have been dealt with openly. By its action the Council has relieved me from a considerable amount of anxiety and responsibility, and if those who support the Society and the larger number outside who come under its influence are satisfied at the method adopted, and the result attained, I have no cause to complain.

CHARLES SYMES.

LIQ. FERRI HYPOPHOSPHITIS FORT., B.P.C.

Sir,—In the Journal for September 8 the Committee of Conference publish some additional formulæ, among which one for liquor ferri hypophosph. fort. is said to contain about 5 grains of hypophosphite of iron in the f3j. As the equivalent of sulphate of iron is 278, and that of $Fe2(PH_2O_2)$ is only 186, the actual amount of the latter is 25·4 grains per fluid ounce, or, allowing for loss in the filtering from $BaSO_4$, about 3 grains to the f3j.

Hull. JOHN S. LINFORD.

*** [Mr. Linford's calculation refers to ferrous hypophosphite, without taking into account water of hydration. It is therefore evident that to prevent such a misconception it would have been useful if the Formulary Committee had indicated the composition of the salt referred to in the formula.—ED. PH. J.]

CHLORIDE OF AMMONIUM IN NEURALGIA.

Sir,—Several of your correspondents have commented on the properties of this chemical as a cure for neuralgia.

The remedy in question was popular in Manchester more than thirty-five years since, and for a time held in high repute as "muriate of ammonia." The customers who used it were chiefly of the artisan and lower order, but when it became known as the sal-ammoniac that is used by plumbers, etc., the demand ceased.

It is well known that all nervous complaints are more or less under the control of the will and the imagination, and this appears to be an instance of faith cure by very unlikely remedies, as spider web in chorea, roasted mouse for asthma, tar water, brandy and salt, galvanic rings, etc., etc.

Dr. Brand successfully treated obstinate nervous ailments that had defied the skill of many practitioners, with bread pills. He explained that by "directing the patient's intense attention and expectancy to the powerful remedy, a curative influence was induced."

May not this theory explain to some extent the influence of the infinitesimal dose of the homæopath?

Richmond, S.W. R. GOODWIN MUMBRAY.

J. J.—(1) Yes, there is a stem when the plant is in flower in the second year. (2) The leaves are bipinnate, with incise-dentate. For further details see Babington's 'Manual of Botany,' or any similar work.

A Registered Chemist.—The inconvenience you refer to attaches to all alcoholic articles that are capable of being used as beverages if they contain more than 2 per cent. of proof spirit.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Elborne, Wharmby, Rowntree, Ritchie, Stokes, Registered Chemist.

1888. TWENTY-SECOND SEASON.

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"AN ARTICLE OF ACKNOWLEDGED EXCELLENCE."

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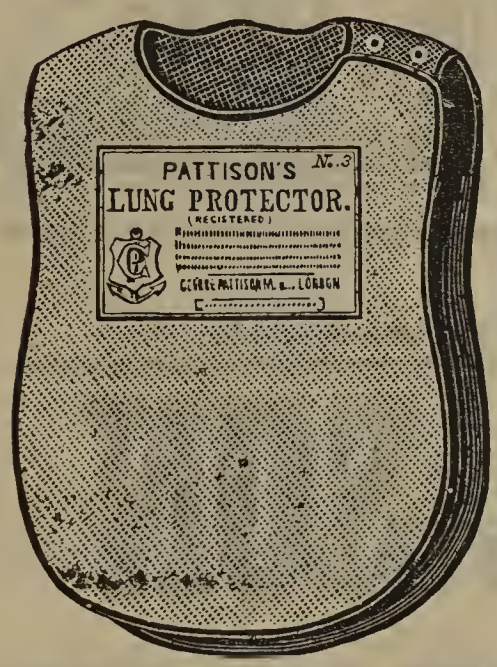
Chemists are respectfully cautioned against imitations made from lower quality Wool, although sold as "Best Felt."



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Lung Protector.
THE AMERICAN

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ORIGINAL PATTERN, Eight sizes ...	14/-	18/-	26/-	34/-	42/-	52/-	60/-	70/-	per doz.
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FELT CHEST PROTECTORS, C. QUALITY. { Single .. No. 1, 7/-; 2, 9/-; 3, 11/-; 4, 14/-; 5, 18/- per dozen. Double .. No. 1, 16/-; 2, 22/-; 3, 28/-; 4, 34/-; 5, 44/- „

These are warranted equal to BEST of other makers, but are NOT recommended.

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J. & W. BYGRAVE,
SHOP FITTERS,

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A note from the CHEMIST and DRUGGIST, page 358, September 15, 1888.

"An imposing shop has recently been fitted up at 243, Brompton Road, Kensington, by Messrs. J. W. BYGRAVE for Mr. W. B. TRICK. . . . . The shop is double-fronted, 43 by 21 ft., and is probably the largest Pharmacy in the West of London. The fittings are all of excellent workmanship, and the arrangements throughout are admirable. It is to be provided shortly with the Electric Light."

We have also fitted probably the largest Pharmacy in the North of London, for Mr. GRIFFITHS, 274, Seven Sisters Road, Finsbury Park. This shop has been admired by numerous Chemists for the style and neatness of the fittings, &c.

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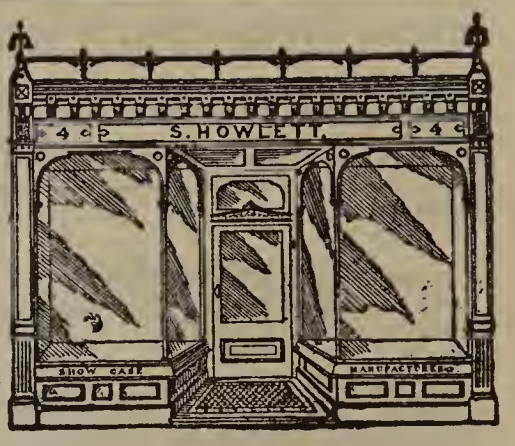

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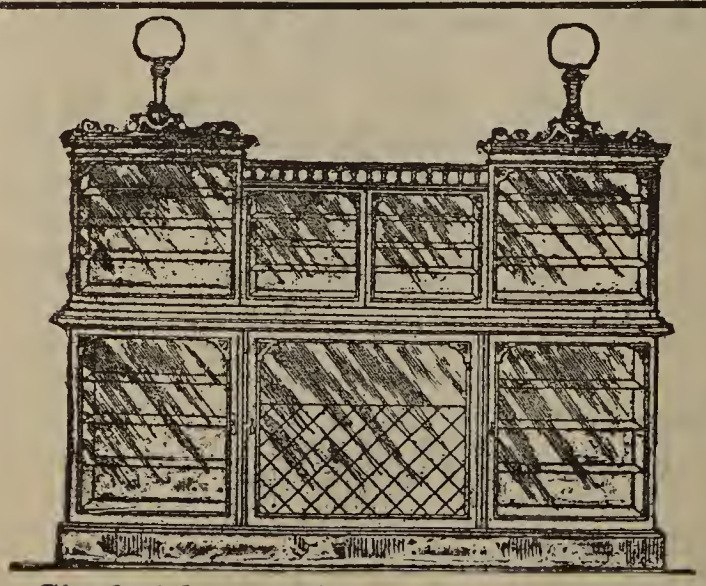

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The counter has a solid mahogany top and plate-glass case front, the centre part fitted to take sponge.

A mahogany screen on top, consisting of plate-glass cases.

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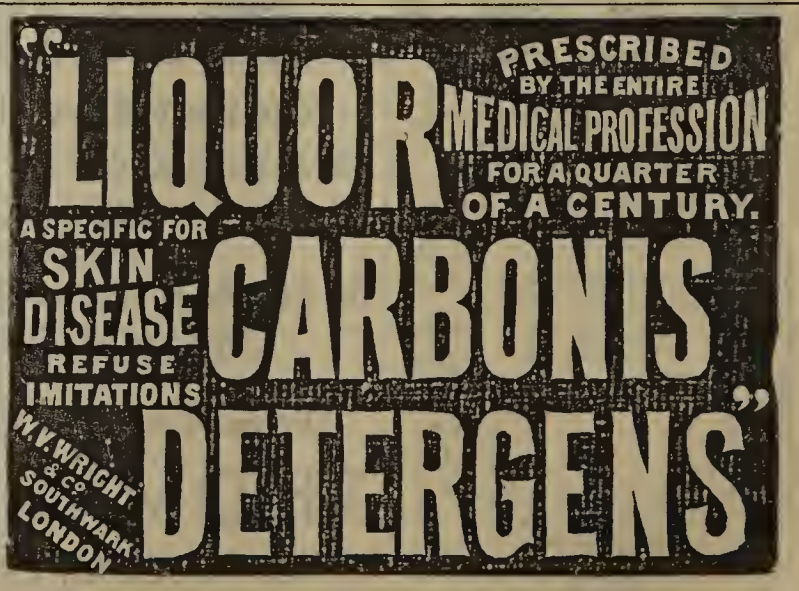

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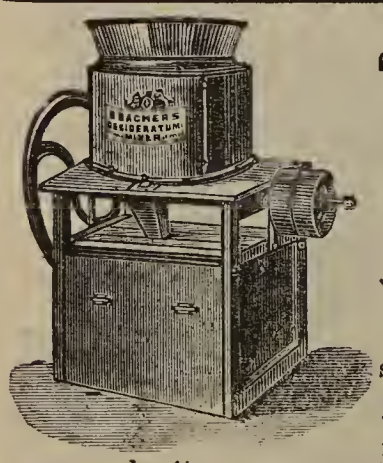

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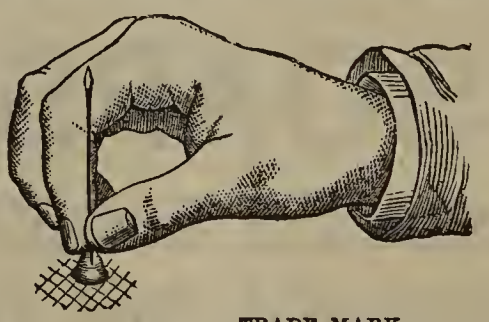

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Fourteen Students from M. C. P. entered for the October Minor Examinations.

Eleven passed. Four at their first attempt; Five at their second. See last week's JOURNAL.

Last October **Twelve** "Manchester men" passed, and over **Forty** have passed the Minor during the year.

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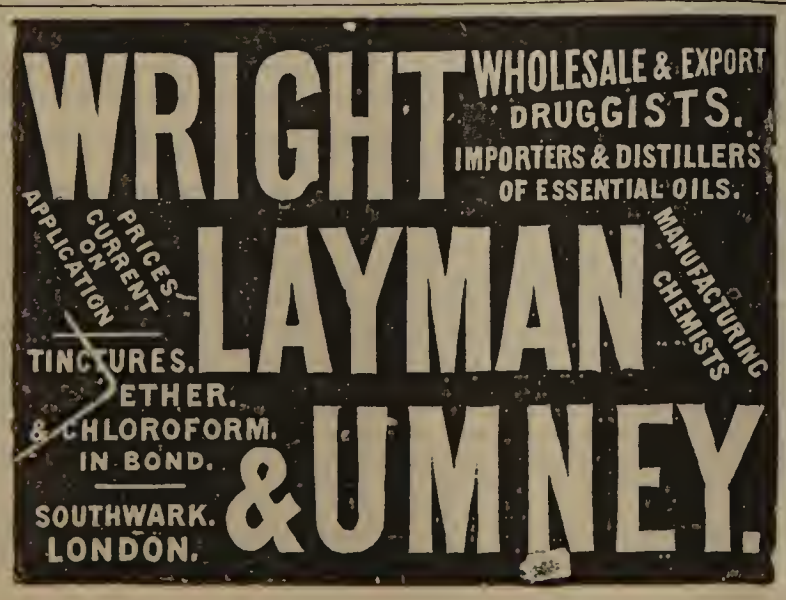

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MINOR.

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„	F. W. JACKSON	Blackpool.
„	J. M. JONES	Conway.
„	C. G. MCGIBBON	Liverpool.
„	G. H. NICOL	Dumfries.
„	C. F. PARKER	Liverpool.
„	E. H. ROGERS	London.
„	W. A. ROBERTS	Bangor.

In July Seven passed the Minor from the Liverpool School, **making a Total of Fifteen for the Two Examinations.**

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FIVE PASSED.

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DONALDSON, G.	Portsea.
GORFETT, W. T.	Portsea.
GRAYSON, J. H.	Whitehaven.
JAMES, W. M....	Market Drayton.
JOHNS, T....	Woolwich.
KERRIDGE, H. M.	Ipswich.
NEALE, F. H.	Liverpool.
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TOMKINS, W. K.	Oxford.
WANSBROUGH, E. G. L. ...	Barrow-in-Furness.
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AN energetic and reliable ASSISTANT. One who has had experience in a good dispensing house. Address, with references to previous engagements, and usual particulars, to M. P. S., care of Dutton & Son, Post Office, Rock Ferry, Birkenhead.

APPRENTICE. (Out-door.) A Pharmaceutical and Foreign Chemist (West-End) would treat with an intellectual youth. Facilities for attending lectures, &c., and acquiring knowledge of French Pharmacy. Address, PARIS, care of Messrs. Evans, Lescher and Webb, 60, Bartholomew Close, E.C.

IMMEDIATELY.—A qualified DISPENSER. One accustomed to a good class cash Business. Apply, W. BURROWS, 243, Brompton Rd., S.W.

ASSISTANTS WANTED.

WHOLESALE.—An experienced Dryman wanted. Address, with usual particulars, stating age and salary required, to Alex, care of Rudolf Mosse, Esq., 16, Queen Victoria St., London.

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YOUNG Pharmacist, by a firm of manufacturing chemists. Must have had good practical experience in laboratory work. Apply by letter, stating age, salary required, and experience, to Y. P., 38, Kingsdown Rd., Upper Holloway, London, N.

IMMEDIATELY.—A competent Assistant for permanency. Board out, sleep on premises. Middle age, or not less than 25. Enclose photo (to be returned). State height, experience, salary, and testimonials, &c., to J. E., 14, Bath St., Jersey.

IMMEDIATELY.—A qualified Dispenser. Minor or Major. Unmarried. Outdoor. State age, height, references, and salary required. Applications not answered in three days to be regarded as declined. Apply Mottershead & Co., Pharmaceutical Chemists, Manchester.

WILCOX & CO., 239, Oxford St., London, require an Assistant about 22. Qualified. Salary £48 with £6 annual increase. Must have good appearance and be well up in retail and Dispensing. Apply, in first place by letter, stating particulars of previous situations and enclose photograph.

APPRENTICE wanted. A pharmaceutical chemist requires a youth as Apprentice. Indoors. Premium. Comfortable home. Time for study. Write C. D., Messrs. Hodgkinson, Prestons & King, 81, Bishopsgate St. Without.

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A JUNIOR Assistant. About 23 years of age. One who has been accustomed to a good class Dispensing and Retail business. Time for evening lectures could be arranged. State salary expected, and usual particulars. Apply at 16, Bishops Rd., Hyde Park, W.

QUALIFIED Assistant. Indoors. About 25. Of good address. Must be accustomed to good class Dispensing and Retail trade. Apply with full particulars of previous engagements, salary required, &c., enclosing photo, to be returned. Foster Blades, 10, Gloucester Rd., South Kensington.

FOR China.—A qualified, energetic Assistant. Age from 24 to 30. Single. Must be honest, sober, industrious, and thoroughly trustworthy, and have had good all-round experience in first-class houses. Address full particulars Box 106, Messrs. Horner and Sons, Mitre Sq., Aldgate, E.C.

A QUALIFIED Assistant, not under 25 years of age, steady, and of good address. If able to Extract Teeth preferred. State age, height, salary required, when disengaged, and enclose carte if convenient, to Fides, Messrs. Hodgkinson & Co., Upper White Cross St., E.C.

DEC. 1.—A trustworthy Junior, competent to take charge in absence of principal. Good address indispensable. Plenty time for study. Salary. Carte and references to B. Banks, Chemist, Folkestone.

AN Assistant accustomed to high class retail and dispensing. Apply, stating usual particulars and enclosing photograph, to Clare & Hunt, Scarborough.

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A DISPENSER wanted for three Evenings a week from the end of November. A personal interview preferred. Apply to J. R. Wooster, Chemist, 202, High Rd., Chiswick.

SENIOR Assistant. Qualified. Age 24 to 26. Energetic at Counter, quick Dispenser, and accustomed to a good class country business. Apply, either personally or by carte, stating age, height, salary, former experience and references, to John Rae, Chemist, Newmarket.

AN Assistant at once. Qualified preferred, but not necessary. Unquestionable reference. Gentlemanly address. Good Prescriber, Tooth Extractor, and Counterman. Send photo, Whorley, Chemist, Wigan.

IN about a fortnight's time. An active and obliging Assistant. Qualified. Also an intelligent Youth as an Apprentice, who would have every opportunity to thoroughly learn his business, accompanied with West End experience. Apply to Pharmacist, 53, Gt. Marylebone St., Portland Pl., W.

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EASTERN COUNTY.—Retail and Prescribing BUSINESS. Returns £850. Price £600. Low rental.

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Valuations for Probate or Transfer conducted in any part of the United Kingdom. Terms on application.

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FOR Sale, a great bargain, the entire fittings of a Chemist's shop, including drawers, shelving, counters, show cases, dispensing screen (very handsome), carboys, window fittings, and also the stock. Must be cleared.

Estimates furnished to fit up shops in any part of the Kingdom.—R. TOMLINSON & SONS, Medical Fitters, &c, Bond St., Constitution Hill, Birmingham.

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Vendors of good class Concerns can be at once supplied with Partners or Buyers, as F. J. Brett has buyers prepared to invest from £1500 to £3000.

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A gentleman having received a good offer abroad, wishes to dispose of his BUSINESS, in one of the best streets in Douglas, Isle of Man, and will take less than the value of stock and fixtures to secure an early sale. No qualification or registration is necessary. Capital required about £300.

A capital country Retail and WHOLESALE. Returning over £1000 at good profits, in a market town in Staffordshire. In present hands 30 years. Low rent. A younger man will do a largely increased trade. Valuation only, about £300.

Several good Businesses in all parts of the country.

Buyers are invited to state their requirements. Vendors having Businesses in London or South of England can be introduced to purchasers.

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TO BE SOLD.

Established over 50 years. Small capital only required to realise a fortune. Apply to

NEURALGIA, 17, Mead Place, West Croydon.

TRADE SECRET FOR SALE. Famous Tic Cure.

Proprietor (now deceased) of this remedy sold enormous quantities of Tic Pills over Counter and through Post, without advertising, at one penny each, big prices being offered when supply stopped. Secret of preparation now thrown open to all Chemists sending 2s. 6d. postal order.

MILNER, 51, Infirmary Road, Sheffield.

CHEMISTS' TRANSFERS.

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MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

VENDORS have the advantage of obtaining an opinion on Value, derived from extensive experience, and are in most cases enabled to avoid an infinity of trouble by making a selection from a list of applicants for purchase, with the view of submitting confidential particulars to those alone who are most likely to possess business qualifications and adequate means for investment.

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3. £700. — MIDDLESEX. Dispensing and Prescribing BUSINESS of good class. Established many years. Returns £700. Very good prices. Well fitted double-fronted shop and good stock. Rent £50. Good house and garden. About £700 required, or offer.
4. £641.—EASTERN COUNTIES. Unopposed country BUSINESS (Mixed). Returns last year £641, with good profits. Single-fronted well fitted shop and good stock. Vendor taking a larger will accept £300. Good house, garden, &c.
5. £2000.—YORKSHIRE. Retail, Prescribing and Dispensing BUSINESS, with Wine Agency attached. Returns last year over £2000, with about £500 net profits. Large, handsome shop, well fitted, and good stock. About £1500 required.
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Terms for valuation on application.

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COD LIVER OIL

Pale—Bright—Limpid and of delicate flavour, maintaining its brilliancy at 32° F.

The fishing contiguous to our stations has been highly satisfactory this season, the fish being large and in prime condition, consequently the yield of Oil has been good, and of remarkably fine quality.

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Soluble Saccharin

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In bottles containing $\frac{1}{6}$ oz., at 1*s.*; $\frac{1}{2}$ oz., at 2*s.* 6*d.*; and 1 oz., at 4*s.* 9*d.*, retail. Attractively put up for display on the counter.

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Each containing half a grain of Saccharin, with just sufficient alkali to render it soluble.
In tubes at 1*s.*, 2*s.* 6*d.*, and 5*s.*, retail. 8*s.*, 24*s.*, 50*s.*, per dozen, wholesale.

Tabellæ and Soluble Saccharin supplied in bulk to the Trade.

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BY PATENT PROCESS.

Non-adhesive, and retaining their brilliancy and softness for long periods.

BLACK CURRANT.
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EXTRACT OF MALT.
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LIQUORICE.
MAGNUM BONUM.
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Estimates given for preparing Lozenges, Jujubes, or Pastilles from private formulæ.

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PRICE LISTS AND SAMPLES FREE ON APPLICATION.

London: Printed by William Inglis Richardson, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. Churchill, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 961.] SATURDAY, NOVEMBER 24, 1888. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

17, BLOOMSBURY SQUARE, LONDON.

An EVENING MEETING of the Society will be held at the Society's House, 17, Bloomsbury Square, London, on Wednesday, December 12th, at half-past Seven.

The chair will be taken at Eight *precisely*.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at 7, and the Curator of the Museum will be in attendance to give any information or explanation with regard to the objects exhibited that may be required.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, December 5th, as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society, of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of THREE ANNUITANTS on the Benevolent Fund of this Society will take place on Thursday, the 6th day of December next, at 12 o'clock precisely.

RICHARD BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 3rd, 1888.

For List of Approved Candidates see next page.

There are at present *forty-nine* annuitants, receiving £1670 per annum, and casual relief is also granted, amounting in 1887 to nearly £500. The total expenditure in 1887 was £2375.

The following is the scale of pensions :—

£30 per annum to pensioners under 65 years of age, and £35 per annum to pensioners 65 years of age, and upwards.

ABSTRACT OF RULES IN REFERENCE TO VOTES AT THE ELECTIONS OF ANNUITANTS.

Annual Subscribers of
Half-a-crown are entitled at each election of Annuitants to .. .. ONE Vote.
Five Shillings .. .. TWO Votes
Half-a-guinea .. .. FIVE Votes
One Guinea .. .. TEN Votes.
And to increase in the same proportion.

Five Guineas are entitled to .. .. FIVE Votes for life.
Ten Guineas .. .. TEN Votes for life.
And to increase in the same proportion.

Should any Subscriber or Donor, or the widow of any Subscriber or Donor, become a Candidate for an annuity, such number of votes shall be placed to his or her credit, at the first succeeding election, as shall be represented by the whole amount of subscriptions or donations to the Benevolent Fund he or she (or in the case of a widow, her husband) may have contributed.

Donations and Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to RICHARD BREMRIDGE.

BENEVOLENT FUND.

APPROVED CANDIDATES.

BROWN, ELIZA. Louth. Age 58. Widow of a member from 1853 to 1885, and subscriber to the Fund. Applicant is entirely dependent on the temporary charity of friends, and is in bad health. Her own son is unable to assist her, and two step-children do not contribute towards her support.

CHAPMAN, RICHARD J. Aberystwith. Age 75. A member from 1849 to 1888, and a subscriber to the Fund from 1871 to 1885. Applicant was in business at Ongar thirty-five years, and subsequently went to Smethwick, where he was unsuccessful. He has hitherto had an allowance from his son, but the latter is unable to continue the assistance. Two other children do not contribute to applicant's support, and he is unable on account of his age and infirmities to earn anything.

EDWARDS, HANNAH C. 89, Church Street, Stoke Newington. Age 60. Widow of a registered Chemist and Druggist in business before August 1st, 1868. Applicant suffers from valvular disease of the heart, which renders her quite incapable of following any employment or doing regular work. Most of the friends who formerly assisted her are now dead, and she is dependent on a friend with whom she is staying at present.

JONES, AUGUSTA. Age 60. Marlborough. Widow of a registered Chemist and Druggist in business before August 1st, 1868. Husband was in business twenty-four years at Cowes and Marlborough, and died in 1878. Applicant continued to carry on the business until 1884, but was unsuccessful. The interest on £100 invested in gas shares is all she now has to depend upon, as she has no relatives able to help her, and her health is very feeble. [*Second application.*

MUMBRAY, HENRY G. Crumpsall, Manchester. Age 67. A member from 1870 to 1887, and subscriber to the Benevolent Fund from 1867 to 1884. Applicant has been in business in and near Manchester twenty-seven years, but was obliged to sell out in 1886 to satisfy his creditors. His only support is the small sum he can earn by occasional employment as locum tenens, and this, owing to his age and infirmities, must shortly cease. There is no one to assist him except an adopted daughter, earning £50 a year, who does what she can. Applicant's wife is in chronic ill-health.

SPENDELOW, MARY E. Liverpool. Age 58. Widow of a registered Chemist and Druggist in business before August 1st, 1868. Husband was unsuccessful at the Elections of Annuitants in 1885 and 1886, and died in January, 1887, leaving his widow entirely without means. Applicant suffers from lung disease.

[*Second application.*

STEVENS, ELIZABETH J. Lichfield. Age 77. Widow of a member from 1853 to 1881, and subscriber to the Benevolent Fund from 1867 to 1881. At the time of her husband's death in 1881 applicant had £100 of her own, and the sale of the business produced an additional £146. She has since lived on this money (£246), and is now without means of support. She is totally unfit, by reason of her great age and ill-health, to help herself, and she has no friends able to assist her.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

FORTY-SEVENTH SESSION, 1888—89.

Emeritus Professor REDWOOD.....CHEMISTRY AND PHARMACY.
Emeritus Professor BENTLEY .....BOTANY AND MATERIA MEDICA.

Professor WYNDHAM DUNSTAN.....CHEMISTRY.
Professor ATTFIELD .....PRACTICAL CHEMISTRY.
Professor GREEN .....BOTANY.
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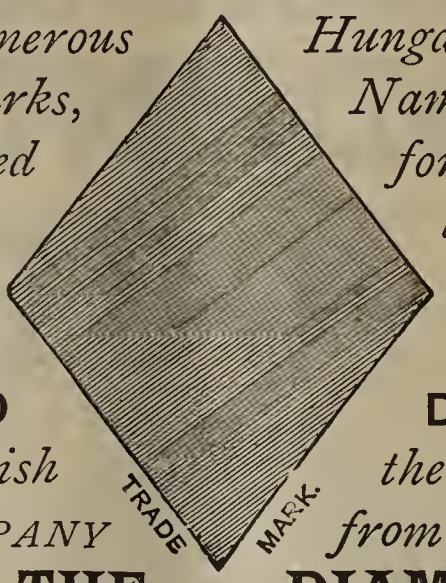

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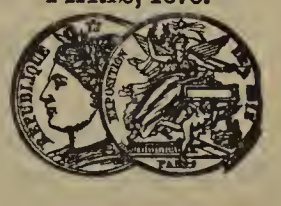

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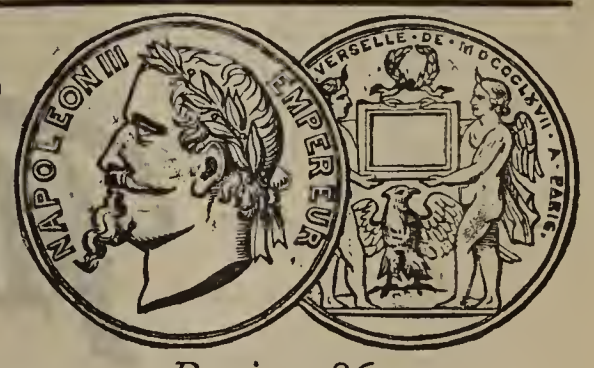

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NOTES ON THE HISTORY OF MEDICINE IN ANCIENT EGYPT.

BY PERCY E. NEWBERRY.

Within recent years great progress has been made in the science of Egyptology, and it may be interesting to the members of, and those interested in, the medical profession to know that Egyptologists are now in possession of materials which carry back the history of their science for at least five thousand years before the commencement of the Christian era. The materials by which they can do this, also, bear internal evidence of great skill in medicine, anatomy and surgery, which must have been the growth of many antecedent ages, all memorials of which are now buried in the obscurity of the remotest antiquity.

These materials consist, for the most part, of medical prescriptions written in *hieratic** writing upon thin strips of papyrus. Each prescription is generally headed by the name of the disease that it is to be used for. It then gives the ingredients which are to be mixed together, and either taken internally or put on as a lotion, and then it sometimes, though not invariably, finishes up with a magic formula to be repeated by the physician or by the patient. Magic, however, was only used as a last resource when the skill of the physician had been baffled and all hopes of the patient's recovery were lost. Several hundred of these prescriptions and receipts are preserved in the different museums of Europe, and they are of great scientific value, not merely from the light they throw upon the early history of medicines, but also because they make us acquainted with the classes of disease chiefly prevalent among the ancient Egyptians, and this, of course, collectively illustrates the state of society in general. Besides these prescriptions, stray references to medicines are not unfrequently found in the hieroglyphic inscriptions cut into the stone of the old temple walls; indeed, many of the ancient Egyptian temples appear to have had laboratories attached on whose walls receipt after receipt was chiselled. These receipts, however, are for the most part purely chemical receipts, such as for assaying, hardening and colouring gold, silver, copper, lead, tin, etc. Fac similes of many of these hieroglyphic inscriptions and hieratic papyri have now been published, but they are for the most part scattered in works both learned and costly, of which no short summary has as yet been produced. In this paper it is proposed to give a short account of the materials which relate to the purely medical knowledge of the ancient Egyptians, whilst in a future paper it is proposed to deal with the purely chemical receipts. By so doing it is hoped that the great value of these materials, almost wholly unknown to the generality, may, at least in some degree, be understood.

The science of medicine was one of the earliest discoveries of the Egyptians; indeed it is recorded by the Egyptian historian Manetho, that one of the earliest native kings, Athothis by name, wrote a book on anatomy, for he was a physician. This king was the successor of Mena, the first king of the first Egyptian dynasty, and lived, according to the distinguished French Egyptologist, M. Mariette, about five thousand years before the commencement of our era. Manetho also states that another native Egyptian king was famous for his knowledge of medicine, and these two statements have received indirect confirmation from three medical papyri, which are assigned in their titles to kings of this remote age, though our copies are certainly not older than the year 1700 B.C. Of these three papyri one is but a fragment, which when Teta (a king of the Sixth dynasty) sat in the throne, was much prized by the Egyptian ladies as a means for making the hair grow. The second papyrus is far more interesting, and dates from the time of Mencheres, one of the kings of the fourth Egyptian dynasty, who lived, according to M. Mariette, about the year 4100 B.C. The manuscript, we are told by the old Egyptian writer, in his introduction to the papyrus, was, for many centuries, "enclosed in a writing case under the feet (of the statue) of the god Anoubis." In the time of the King Senta, however, it was, we are told, "rediscovered," and brought to the king "on account of its wonderful value." The manuscript then appears to have been copied by some old Egyptian physician, on to a new roll of papyrus, along with a number of other prescriptions of a much later period. This copy was discovered by Passalacqua in an earthen vase near Thebes in 1823, and is now preserved in the Egyptian Museum, Berlin.* The portion of the work which the old copyist affirms dates from the time of Mencheres commences:

"This is the commencement of the book of the collection of receipts for curing leprosy."

Then follow a number of receipts which evidently date from a very remote period. The following will serve as an example: "Receipt for curing leprosy."

"Take honey, $\frac{1}{10}$ dram; beer, $\frac{1}{8}$ dram; salt of the north, $\frac{1}{6}$ dram; and drink in the evening."

The third papyrus which refers to the early history of medicine is that known as the British Museum Medical Papyrus. Although this manuscript was written some time in the XIXth dynasty, and alludes to the perfection of the mode of cure in the days of Amenophis III. (one of the kings of the XVIIIth dynasty) as to something of a past age, it contains evidence that the greater portion of the work was composed in the time of Cheops,† one of the kings of the IVth dynasty, and the builder of the great pyramid. The manuscript is much worn, but from what is recognizable it is found to be accompanied throughout by numerous rubrics and directions and very short formulæ of the cures. It has not as yet been published, and is exceedingly difficult to translate, as the words used are not Egyptian, but transcripts into hieroglyphics of another language. This circumstance is of much interest, for it is not merely an indication of the relation of the most ancient Egyptians with civilized countries, but also an indication that these civilized countries had at a very early period physicians of their own. The first part of this papyrus is historical, and commences, "The beginning of the words for sores." Magic at this early period was much resorted to. The manner of charming the wounds is very remarkable, and worth noting:—

"Oh, Ra, creator of the gods . . . . . pass ye

* A cursive form of hieroglyphics.

* A facsimile of this copy has been published by Brugsch-Bey in his 'Recueil de la Monuments Egyptiens, etc.' Part I.

† According to M. Mariette's reckoning he lived about the year 4200 B.C.

me along, renew ye me, avert me from all evil things, all evil maladies, all wounds which are in the flesh on all these limbs."

It is much to be regretted that this manuscript was written in a foreign language, for a number of diseases are noted, which, if they had been recognizable, would have thrown much light on the state of society in Egypt in the earliest times. From what can be made out, however, leprosy or some disease of that nature appears to have been the most prevalent. The word employed to denote the disease in this papyrus is *faka*, a word which is, on the monuments, applied to the yellow or Semitic races. The formula, too, is in a language apparently Aramaic. It is therefore very probable that this disease had been introduced into Egypt by the Semites. These three papyri, though they are but fragments, and the two notices of the historian Manetho, admit us to witness the theory and practice of medicine in the time of the pyramid-building kings, and "we are astonished," says a contemporary writer,* "to find that their physicians were, on the practical side, not much behind ours of three hundred years ago."

No less than three medical papyri date from the XVIIIth dynasty (1700-1400 B.C.), and these show that the mode of treatment in the days of Cheops and in the days of the Pharaohs of the XVIIIth dynasty considerably differed. In the time of Cheops the gods were more frequently invoked to cure the disease, and the physician more frequently exorcised the malady he wished to cure or eradicate. In the days of the Pharaohs of the XVIIIth dynasty he also repeated certain formulæ over the patient, but the progress of knowledge called in more the use of drugs to the aid of fetishism.

The least important of these three papyri are some fragments of a medical treatise preserved in the Leyden Museum.† By far the greater portion of these fragments consist of magic formulas for charming away diseases. There are, however, a few fragments which give therapeutic prescriptions, and these are of much scientific value. Several of them relate to "stopping of the blood," some apparently of blood from the nose, others apparently of blood from cuts. As an example of these receipts the following may be quoted :—

"Remedy for stopping the blood : take water of *'hemou-ô* (mint?), in vinegar ; give the patient to drink in the morning and it will stop."

Another contains an excellent receipt for "curing a sprained foot:"—"Wash the foot with water of a melon (Egyptian *soubra*): rub it with force on to the foot."

Other receipts refer to diseases of women, diseases of the eyes, etc. The pharmacopœia mentioned in these fragments is not large. Some fifteen vegetable medicines are cited, besides a few other kindred materia, minerals (nitrum, stibium, magnesia and iron) and animal substances.

Another monument of Egyptian medical science of the XVIIIth dynasty is preserved in the Berlin Museum, and is known to Egyptologists as the Berlin Medical Papyrus. This manuscript consists of no less than twenty-two pages, and although the commencement, as well as some few of the last pages, have suffered by the frequent usage made of it by the Egyptian physicians, the rest of it is perfectly preserved, and does not offer, with the exception of some groups of written characters unknown at present, any difficulties either for analysing or editing.* The medicines indicated are of five sorts ; ointments, potions, poultices, clysters and frictions. These were composed of a great number of substances taken from all the natural kingdoms. In all more than fifty species of vegetable substances are cited, from herbs and fruits to sawdust and "chips" of cypress and cedar. Among the mineral substances sulphate of copper, salt, nitre, memphite stone (Egyptian *aner sopd*) are mentioned, and were to be applied on the diseased part or laceration, having the virtue of anæsthetics. Of animal substances the live flesh, the heart, liver, gall, grease and fresh and dry blood of various animals, besides cow, goat, and human milk, are noted.

The diseases mentioned in the papyrus are not very easily recognised. They are, so far as can be made out, ophthalmia, ulcers of various kinds (on the legs, body, etc.), a sort of erysipelas, epilepsy, disease of the bowels, diseases of the stomach, various kinds of fevers (Egyptian *'hmâon*), the "divine malady" (the *divinus morbus* of the Latins?) rheumatism in the legs, tumours, and several other kinds of disease which cannot now be determined. A special chapter is given to points relative to childbirth and accouchement, and there are also mentioned several remedies for burns and receipts for "re-establishing the stomach." In some cases the diagnosis is given. The following, for instance, is a literal translation of one of a sort of inflammation :—

"Heaviness to the stomach ; the top of the heart malady ; inflammation of the heart and beating accelerated. The patient's clothes feel heavy and warm. Great thirst. The taste perverse, as of a man who has eaten of the fruit of the sycamore. Sinking of the flesh, as of a man who is very ill. When he has motion his stomach is inflamed. It refuses to relieve him."

Perhaps the most interesting portion of this papyrus, however, is that which relates to the Egyptian theory of the vital principle, which seems to have implied a notion of the circulation of the blood. The portion of the papyrus which refers to this runs :—"To treat a man for whatever disease he has, know that his head has thirty-two vessels which draw the spirits to his heart, which give the spirits to all his members." Then follows a list of some of these vessels :—"Two vessels conduct the breath to the body, two vessels belong to the occiput, two to the sinciput, two to the *unque*, two to the right ear, two to the left ear, two to the nostrils, two to the eyes, etc." But this is not all. The word used in this papyrus, indeed the general name for heart in the hieroglyphic texts, is *Hati* or *Het*, which forms have an ideographic etymology connected with the idea of "beginning," "commencement," or even "essence," "origin." Another word used in the texts is equivalent to "centre." Now all

* R. Stuart Poole, in an article on "Ancient Egypt," in *Contemporary Review*, September, 1881, p. 372.

† See Conrad Leeman's 'Monumens Egyptiens du Musée d'Antiquites des Pays-Bas à Leiden' (Leiden, 1839, etc.), where a fac-simile of these fragments of papyrus may be found.

* A fac simile of this papyrus has been published by Brugsch-Bey in his 'Recueil de la Monumens Egyptien.' Part 1.

these words are apparently derivatives of *aka*, to go; indeed the word *aka* is sometimes used in the ancient Egyptian texts for "the heart," in allusion to its movement. From this we not only see that the Egyptians knew of the movement of the heart, and considered it as the centre of our being, but also that they considered it as the source of life and thought. Much interesting information on this subject is also to be gathered from the 'Ebers Papyrus,' in which work a whole chapter is devoted to the subject. This chapter is entitled "The Secret Book of the Physician: the science of the beating of the heart, as taught by the priestly physician Neb-Secht." It conclusively shows that the physicians of the time of the Pharaohs recognized the heart as the centre of the circulating system, and that they referred the beating of the pulse to its motions.*

The third, and by far the most important monument of ancient Egyptian medical science, is the great hand-book of Egyptian medicine, the 'Ebers Papyrus.' This great work was discovered about the middle of the present century by an Arab between the bones of a mummy in a tomb in the Theban Necropolis. It remained in the possession of this Arab for many years, until, in 1872, it was bought by the distinguished Leipzig Egyptologist, Dr. Ebers, who has since had it carefully unrolled, photographed and published.† It consists of a single solidly rolled sheet of papyrus about one foot wide and about sixty-six feet long, and formed originally one enormous volume divided into 110 pages which are carefully numbered. The writing is hieratic and is exceedingly clear and regular. Black ink is used in the body of the work for the receipts, etc., but red ink is used at the heads of the sections and in the expression of weights and measures. From the writing and other internal evidence, Dr. Ebers judges that the date at which the work was written may certainly be assigned to about the middle of the sixteenth century, or more precisely to the year 1552 B.C. If we accept this date the writing was prior to the Exodus of the Israelites, in fact, according to the received chronology Moses in 1552 B.C. was just twenty-one years of age.

From this document we learn that the Egyptian priests were also physicians, and that in order to give greater authority to their writings they used to ascribe them to their god of science, Thoth. In proof of this the following passage translated from the first page of the papyrus (l. 8 and 9) may be given:—

"Ra pities the sick; his teacher is Thoth, who gives him speech, who makes this book and gives instruction to scholars and to physicians in their succession."

This god Thoth was the famous Hermes Trimegistus of the Greeks, and is represented by all Egyptian writers as the inventor of the arts and sciences. It was he, we learn from the hieroglyphic inscriptions, who first taught the Egyptians writing, invented arithmetic, geometry, astronomy, etc., gave laws to the people, and regulated the religious ceremonies.

The receipts and prescriptions contained in this treatise are evidently collected from various sources. Indeed it is stated in the introduction to the papyrus that the collection of prescriptions which it contains came from Sais and Heliopolis. "It was this last town," says Ebers, "that contained the 'great halls' which had from mythical times been used for clinical purposes by a celebrated faculty of medicine." "The book," continues Ebers, "contains internal evidence of having been used in the healing art, for the words, 'good,' 'very good,' 'good to try,' occur in the margin in several places written in lighter ink, and in a different hand from the body of the work." The first portion of the work deals with the preparation of various medicines, then follow a number of receipts for curing various diseases. On page 25 we have several "salves for removing the *uhau*," which appears to have been a kind of tumour. On page 47 is given a "Catalogue of the various uses of the castor oil tree." On page 55 commences the section or "book of the eyes." On page 79 we have a number of prescriptions for "curing diseases of the tongue," whilst on page 91 commences the chapter, "on ears hard of hearing." There is also an entire section of the work devoted to the diseases of women and accouchement.* Another section is devoted to "diseases of the abdomen." Another to "salves for strengthening the nerves and medicines for healing the nerves." There is also an entire section devoted to the results arrived at by the Egyptian physicians from their investigations into the ramifications of the nerves.† Among the receipts and prescriptions which deal with more miscellaneous subjects may be noted those for "preventing the hair turning grey, and for treatment of the hair" (f. 65), "receipts for forcing the growth of the hair" (f. 66), and "receipts for the removal of lice and fleas" (f. 89).

The diagnosis appears to have been very careful, as the following literal translation of one will show:—

"Rules for the *re het* (suffering in the pit of the stomach). When thou findest anybody with the hardening of his *re het*, and when eating he feels a pressure in his bowels, his stomach is swollen and he feels ill while walking like one who is suffering from heat in the back, then look at him when he is lying outstretched, and if thou findest his bowels hot and a hardening in his *re het*, then say to thyself this is liver complaint. Then make to thyself a remedy according to the secret in botanical knowledge from the plant *pa chestet* (senna?) and from scraps of dates. Mix it and put it in water and let the patient drink it on four mornings to purge his body. If after that thou findest both sides of his bowels, namely the right one hot and the left one cold, then say of it: That is bile. Look at him again, and if you find his bowels entirely cold, then say to thyself: His liver is cleansed and purified;

* No one who reads this chapter, and who knows that it was at Alexandria that Herophilus, of Chalkedon, first noted the rythm of the pulse in the various diseases, and first brought out (to the Greek world) its connection with the heart, can resist the conclusion that Herophilus really learnt the fact from the priestly physicians of the Nile, who had occupied themselves long before his time with the physiology of the human body.

† See Georg Ebers, 'Papyrus Ebers,' published at Leipzig, 1879.

* Compare Exodus, i., 18, *et seq.*

† This section is of much interest, and if compared with the writings of Dioscorides and Galen will show how much the Greeks and Latins were indebted to the Egyptians for their knowledge of medicine.

he has taken the medicine; the medicine has taken effect."

The medicines noted in this papyrus are internal and external: clysters, fumigations, ointments, frictions, plasters, drinks and even pills are mentioned. The drugs were generally mixed together, pounded, boiled, and then strained through linen. Pure water was used to combine them generally, but beer, wine, oil and milk were also employed. The pills were made by mixing certain substances with honey and rolling them into little balls. The pharmacopœia mentioned is very large, more than sixty vegetable substances being noted beside other kindred materia, minerals and animal substances.* The powerful medicinal effects produced by vegetable mixtures and the facility with which they were obtained will easily explain the great reputation they enjoyed in those early ages. The real causes of the disease were, however, at this early period very little known, and the connection between the complaint and the remedy was seldom or very imperfectly understood, and the success of the physicians must have been in most cases extremely problematical. The object generally aimed at seems to have been to produce a sudden and strong impression on the system, the effect of which must often have proved fatal. Some of the prescriptions mentioned in the Ebers papyrus, however, are excellent, and are still in use at the present day, as, for instance, the following one "to remove illness from the stomach."

"Rub up the seed of the Tekem (castor oil) plant with vinegar and give the patient to drink."

The following are three other excellent prescriptions taken from the same papyrus:

"To drive away the worm—

"Take rind of pomegranate and water. Let it stand over night, strain it and let the patient drink it in a day.

"Cure for sick bowels—

Caraway seed	1–64 dram.
Goose fat.	1–8 dram.
Milk	1 tenat.

"Boil, stir and take inwardly.

"Another cure for the same—

Amhamen (pomegranate) seed . .	$\frac{1}{8}$ dram.
Nehat (sycamore) fruit	$\frac{1}{8}$ „
Beer	1 tenat.

"Boil, stir and take inwardly."

Professor Ebers states in the introduction to the volume of fac-simile plates of his papyrus that notwithstanding there are to be found in this great work many incantations and conjurations from which the priestly physicians could not abstain; still there is no "hocus pocus or gibberish" in it. "On the contrary," he says, "it shows that it was possible to write in the sixteenth century B.C. complex receipts, and that the physicians understood to administer with care the medicines prescribed."

From the sixteenth century on to the fifth, great progress would appear to have been made by the Egyptians in the science of medicine, but no monuments of the science during that time have been handed down to us, except a few unimportant fragments. At the time of Herodotus (480 B.C.) we find the art of medicine divided among them. "Each physician," says Herodotus, "applies himself to one disease and not more." "All places," he continues, "abound in physicians; some physicians are for the eyes, others for the head, others for the teeth, others for the parts about the abdomen, and others for internal diseases" (*Euterpe*, 84). Elsewhere he writes respecting the Egyptians:—"They purge themselves every month three days successively, seeking to preserve health by emetics and clysters, for they suppose that all diseases to which men are subject proceed from the food they use" (*Euterpe*, 77).

Much interesting information respecting the subject of Egyptian medicine in later times is also to be gleaned from the Greek and Roman writers, especially from the elder Pliny, but as this subject has been fully dealt with in a recent "History of Medicine," it is not proposed to deal with it here. It has been the aim of the writer of this paper merely to deal with some of the materials relating to the early history of medicine in Egypt which are very little known outside the small circle of students of Egyptology, and to point out, in some degree, at least, how much we owe to the old physicians of the Nile. It was certainly among these old physicians that the science of anatomy sprang up. In the earliest period of Egyptian history we learn from the Egyptian historian Manetho, that works on anatomy were written. Probably the practice of embalming would have taught something of this science, but it may be doubted whether, in the earlier periods of Egyptian history, any further dissection than what was needful for this purpose was allowed. In Pliny's time, however, we are distinctly told (Pliny, N. H., xix., 5) that "the Egyptians examined the bodies after death to ascertain the nature of the disease of which they died." It was these old physicians that first recognized the heart as the centre of the circulating system, and that first referred the beating of the pulse to its motions. It was they also who first made any investigations of value into the ramifications of the nerves, and a comparison of the section which refers to this subject in the 'Ebers Papyrus' with the works of Dioscorides and Galen will show that it was not Erasistratus, of Kios, who first investigated this subject, but that, in reality, he followed in the steps of the Egyptian masters. Surgery certainly owes to the Egyptian physicians its doctrine of ligaments, and its art of putting them on. Our greatest operators make no secret of the admiration with which they are filled at the skilful methods practised under the Pharaohs in the wrapping of mummies. The teeth of the mummies show the excellence of the dental practice and demonstrate the fact that they had at an early period discovered the art of stopping with gold. They were also probably the first to write therapeutic prescriptions, and it was certainly among them that clysters, fumigations, ointments, frictions, plasters and pills were first used. Truly the Egyptians were, to quote the words of Herodotus, "by far the best instructed people of antiquity," and it must be remembered that the crowning glory of the wisdom of King Solomon was that it "excelled the wisdom of Egypt."

* It is interesting to note that Homer mentions the "infinity of drugs" produced in Egypt (*Ody.* iv. 227). Compare Homer's statement with the mention of many medicines in Jeremiah (xlvi. 2) and also Herodotus, ii. 138.

NOTE ON BAY OIL.

BY F. H. ALCOCK.

There seems to be much uncertainty about the characters of the above oil, more especially with regard to its specific gravity.

The U.S.P. says that the gravity should be 1·040.

It has been shown that an oil of this gravity can only be obtained by fractional distillation and that the true figure is less than 1·000.

In the English market there is the same uncertainty about the uniform character, as is shown by the table below, in which three samples, obtained from three different English wholesale houses, are enumerated.

Sample.	Colour.	S. G., at 15° C.
X	dark brown	0·9813
Y	much darker	0·9827
Z	light straw colour	0·9289.

The odours too are markedly different.

THE PHENACETINES.*

The phenacetines, or acetphenethydines, are three in number, being the ortho, meta and para compounds.

They have the formula $C_6H_4\langle^{OC_2H_5}_{NHC_2H_3O}$.

PARA-ACETPHENETHYDINE occurs under two forms:

(1) That known as "Phenacetine, Bayer," manufactured in Germany, which is a white powder, formed of small crystals, without taste or odour. It is insoluble in cold or boiling water, chloroform, acidulated water, glycerine, ammonium chloride, oils and liquid vaseline. In acetic acid it is soluble and 1 gram is dissolved by 30 grams of alcohol. Sulphuric ether, heated in a water-bath, dissolves more, 20 grams sufficing to dissolve 1 gram, but when the solution cools the phenacetine is precipitated. Phenacetine is insoluble in lactic acid at the ordinary temperature, but it dissolves in it in the proportion 20 grams to 1 gram of acid at 30° C. Above 33° C. the addition of water to the solution does not cause precipitation of the phenacetine. The occurrence of lactic acid in the stomach under conditions favourable to the solution of the compound, furnishes the explanation, according to Misrachi and Rifat, of its rapid absorption.

(2) The para-acetphenethydine manufactured in France by Poirrier occurs in rosy-grey spangles, lighter than the German crystals and melting at 134° C. Very sparingly soluble in cold water, it dissolves readily in boiling water, but precipitates from the solution below 7·4°. Chloroform dissolves it in notable proportion and alcohol takes up 1 gram in 15 grams; from this solution it is precipitated upon the addition of the smallest quantity of water. It is odourless and tasteless.

Preparation.—This consists of several stages: nitration of the phenol, separation of the nitrophenols, ethylation, reduction and acetylation.

The nitration of the phenol is effected by means of more or less dilute nitric acid at a suitable temperature. Ortho and paranitrophenol are formed, the reaction being represented by the equation—

$$C_6H_5OH + NO_3H = C_6H_4\langle^{HO}_{NO_2} + H_2O.$$

The paranitrophenol, separated from the orthonitrophenol, is ethylated by means of an ethylic derivative (chloride, bromide or iodide) and the product separated and reduced by iron or zinc and an acid.

$$C_6H_4\langle^{NO_2}_{OH} + C_2H_5I = C_6H_4\langle^{NO_2}_{OC_2H_5} + IH.$$

Nitrophenol. Nitrophenethol.

$$C_6H_4\langle^{NO_2}_{OC_2H_5} + 3Zn + 6HCl =$$
$$3ZnCl_2 + 2H_2O + C_6H_4\langle^{NH_2}_{OC_2H_5}$$

Paraphenethydine.

The paraphenethydine obtained is purified, then heated with glacial acetic acid at a high temperature during several hours, and afterwards poured into water and purified by several crystallizations from water.

Characteristic Reactions.—If this compound be heated to boiling for several hours with dilute sulphuric acid (sp. gr. 1·26), saponification takes place and paraphenethydine is set free, according to the following reaction:—

$$C_6H_4\langle^{NHC_2H_3O}_{OC_2H_5} + H_2O = C_2H_4O_2 + C_6H_4\langle^{NH_2}_{OC_2H_5}$$

Phenethydine.

Hydrochlorate of phenethydine is very soluble in water; the sulphate is slightly soluble. If sodium nitrite be added to an acid solution of phenethydine, chloride of diazophenethol is formed.

$$C_6H_4\langle^{OC_2H_5}_{NH_2} + 2HCl + NaNO_2 =$$
$$C_6H_4\langle^{OC_2H_5}_{N-N-Cl} + 2H_2O + NaCl.$$

The diazophenethol poured upon an alkaline solution of bisulphonaphthol, at a low temperature, gives a very fine yellow-red colour, the reaction being as delicate as that of persalts of iron with sulphocyanate of potassium or of ammonia with salts of copper. If chloride of sodium be added to the mixture containing the colouring matter it is precipitated and can be collected upon a filter.

ORTHO-ACETPHENETHYDINE occurs in brilliant white spangles, very light and without taste or odour. It melts at 70° C. It is very slightly soluble in cold water; in warm water it dissolves freely, and separates from solution upon cooling below 44° C. It dissolves readily in chloroform and in 90 per cent. alcohol in the proportion of 1 in 3. If water be added to such a solution the orthocompound separates only after some hours.

The method of preparation is the same as that of the para compound, starting with orthonitrophenol. The ortho compound does not saponify under the same conditions as required for the para compound. Whilst the latter loses its acetic radical when boiled for some hours with sulphuric acid of sp. gr. 1·26, the former requires to be heated to 90° C. for two hours with sulphuric acid of sp. gr. 1·575. The ortho phenethydine gives with nitrate of sodium and bisulphonaphthol a cherry red colour, whilst that given by the para compound is yellow, as already mentioned.

This colour reaction is said to be useful in the detection of the acetophenethydines in organic liquids, the process recommended being as follows. The liquid to be examined, urine for example, should be evaporated to dryness, aud the residue treated with alcohol, which dissolves the phenacetin. The alcoholic solution filtered and evaporated, leaves a residue which after being boiled for two or three hours with sulphuric acid, sp. gr. 1·26, will contain, in the condition of phenethydine, any phenacetin that was present. The sulphuric solution is treated at a temperature of 5° or 6° C. with a small quantity of a 1 per cent. solution of nitrite of sodium for five minutes, and is then poured into an alkaline solution of bisulphonaphthol, prepared by dissolving that compound in an excess of ammonia water. In order to obtain this reaction it is important that whilst the phenethydine and nitrite of sodium liquid should be acid, the solution of bisulphonaphthol should be sufficiently alkaline to leave the mixture alkaline after they have been added to each other. Operating in this way, if phenacetine be present an intense and characteristic colour reaction is

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* Abstract of a paper in *Les Nouveaux Rem des*, October, p. 436.

obtained, and the quantity may be estimated by colorimetric methods.

The reported observations as to the therapeutic value of this ortho compound are not yet numerous, but the results have been good. It requires to be administered in larger doses than the para compound. It has been given as an antipyretic in acute tuberculosis.

META-ACETPHENETHYDINE occurs in white spangles, without taste or odour, and melting at 96° C. It is difficult to prepare, and from a therapeutic point of view, has been found very inferior to the para ortho and compounds.

In estimating the relative merits of para and ortho phenacetine as compared with other medicines, the writer of the memoir from which the foregoign is taken states that they possess the same properties as antipyrin, being antihyperthermic, analgesic and anti-polyuric. They have often succeeded in cases where antipyrin has failed, and no doubt the reverse holds good, on account of idiosyncracies. Antipyrin has an advantage over the phenacetines in being soluble in water, which allows of it being administered hypodermically or *per rectum*. But, on the other hand, the phenacetines are superior to antipyrin and acetanilid in being non-poisonous, and in the extreme rarity and mildness of the disturbances to which they give rise as compared with the frequent gastric and cutaneous troubles caused by antipyrin and the cyanosis induced by acetanilid. Their insolubility does not prevent their administration to children, as they are tasteless and can be mixed with sugar.

THE AMBER FISHERS OF THE BALTIC.*

The Samland, the region lying between the Frisches Haff and the Kurisches Haff, equi-distant nearly from Dantzig and Memel, is the home of the amber fishers of the Baltic. Germans call it the California of East Prussia, and, standing under the shadow of the light-house at Brüsterort, where the peninsula juts out into the sea, one can see with the naked eye, on a moderately fine day, the entire stretch of coast from which, for more than three thousand years, the bulk of the amber supply of the world has been obtained. Twenty, thirty feet deep, and more, beneath the sand-dunes that extend for miles around, and form the ocean floor here, are the veins of "blue earth," as it is termed locally, in which the petrified yellowy and yellow-brown masses are found embedded; and a little way out beyond the lighthouse on the Fox Point, where a fleet of black boats generally rides at anchor on the grey-green water, is one of the great amber-reefs of the "Bernstein-Küste," a veritable layer of amber cropping up in the sea bed, and heaped up by the ceaseless action of wind and water. The "blue earth" formation runs far back inland, so that amber can be mined as well as fished, as it, in fact, is in some places in the district. But as the deposit is so much nearer the surface under water, where it is being continually exposed by the gradual sinking of the sea-level, while the ebb and flow of the tide and the frequent storms that occur along the coast help to free the amber from the sand and weeds in which it is hidden, it is found more profitable, as well as easier, to "fish" than to "dig" it. A few years ago, digging was largely carried on in the Samland, and assumed almost the proportions of a regular industry. Five or six peasants, not possessing the right to "fish," would combine, and obtain permission to excavate in likely spots on the estates of private persons. The result was profitable, but, in the end, the "digging" proved a source of unmixed evil to the locality. The "diggers" began to cheat the proprietors of their proportion of the yield, and invariably concealed a good find. Dealers, who crowded into the district in the hope of picking up bargains, cheated the diggers. Then people commenced digging in parts forbidden to them, making what were termed "moonlight" expeditions to promising grounds. Fights with inspectors were of constant occurrence; when disturbed, the "diggers" had no hesitation in having resort to firearms, and murders became quite common, so that the Government was obliged to prohibit this form of amber-getting. The right to "fish" belongs to the coast villages and communities, and, in parts, to the State. The latter farms out the grounds belonging to it to certain Königsberg and Memel firms. One of these, Messrs. Stantien and Becker, agreed, in 1862, to keep open the water-way of the Frisches Haff—which needs constant dredging—and pay twenty-five thalers a day besides, if they were allowed to dredge there for amber. That the contract proved not unprofitable to them may be inferred from the fact that, when the six years for which they had tendered expired, they offered two hundred thalers per working day, instead of the original twenty-five. The take of amber at Schwarzort, where the dredging is carried on, was estimated at seventy-five thousand pounds for the working year of about thirty weeks.

Amber-fishing is no child's play, and the fishers of the Samland are an exceptionally vigorous and hardy lot of men, as they need be, seeing that they work either shoulder deep in the water, when the salt spray dashing over them falls in chilling icicles upon their faces, or are obliged to spend hours in a constrained position on the sea bottom, in heavy diving armour, when the air temperature is often a good deal below freezing point! They are not Germans, but Samaites, of the Kurish race, who have given a good account of themselves in many a frontier fight with Cossacks and Russ. Stormy weather is the time to see the village fishers at work, for then wind and wave do what man's hands cannot accomplish. The sea, lashed into fury, loosens the boulders that press upon the amber masses underneath, disentangles them from the weeds and "see-tang" by which they are attached to the bottom, and sets them rolling inshore. Scouts are always on the look-out for approaching bad weather, and when a fierce north-easter comes roaring down the Baltic, sending the surf surging over the sand dunes, and strewing the sand with wrack, the fisher villagers are warned that their harvest is a-ripening. Soon all are gathered near the water's edge ready for work. The fishermen, armed with long hooked forks and hand nets, wade shoulder deep into the sea, careless of the waves that buffet them to and fro, and seem almost to take them off their feet at times. With their forks, some poke at the masses of seaweed and "tang" driven towards them by the crested surf, and catch as much as they can, and drag it landwards, while others try to gather in their nets any stray pieces of amber tossed about by the surging waves. As fast as the masses of weed or single pieces can be got ashore, they are passed on to women who stand as near as they can to the water, and who quickly loosen from them the fragments of amber, large or small, that may be attached. These are then put into bags, sorted, and sold to the dealers, who not unfrequently accompany the fishermen on such occasions, in the hope of picking up a fine specimen before any rivals have the chance of seeing it. As it happens, though, it is the smaller pieces of amber that are cast ashore by the sea. The larger and finer blocks are rolled about on the sea-floor and remain behind, the ceaseless play of wind and wave helping to cover as well as to uncover them. To get at these, the amber seekers wait a day or two until the wind goes down and the storm abates. Then, when the sea is smooth enough to see the bottom, they row out into the shallows, where there is not more than five to fifteen feet of water, and look for any amber blocks the waves may have uncovered or rolled in

* From the *Standard*.

during the gale. When such are found they are raised by means of long pronged forks, and nets held out as before. On a fine morning, after a stiff hurricane has been blowing in the Baltic, scores of little boats may be seen off the shores of the Samland peninsula, the occupants bending over the sides, and eagerly peering into the sea in search of any amber treasures left by the departed storm. But the village fisherfolk only get the gleanings; the harvest proper is gathered by those at work on the amber reefs in deeper water.

For reef fishing, which is carried on off the coast of Brüster-ort, divers, specially trained to the work, are employed. The reef, a little to the north-east of the Samland promontory, is the most valuable in existence. It is over six hundred feet long, and more than four hundred feet broad, and consists of solid pieces of amber, deposited by the currents that meet just there, and embedded in the sand and sea-weed that accumulate about it, and covered, in some parts, by huge boulders and blocks of stone. The barrier has been formed in the course of many centuries, and is now worked ten months out of the year, by the little flotilla of black boats that lie about three-quarters of a mile out, off the Brüster-ort lighthouse. Seen at a distance, the occupants of the boats seem idle enough as they sit in the stern, silent and pre-occupied; but, rowing out to the fleet, one finds the men to be busy enough. Each of the half-score boats at anchor here has six hands on board, besides the divers, who are at work below. Two pair take charge alternately at the air-pumps, which must be kept going without an instant's stoppage; one holds the life-lines in his fingers, watching for the least pull, which is a signal to haul up, and the last is the overseer, who keeps an eye on everything. The pumpers fix their gaze steadily upon a little dial plate placed amidships, and do not even turn as we row close up to them. They are watching the air-pressure gauge, for too much air would prove as fatal to their mates below as too little, so their eyes never wander from the register in front of them. Every now and then strange and uncouth-looking figures are drawn out of the depths and rise to the surface, dripping wet, and are hauled into the boats—divers, evidently, and yet unlike ordinary divers—monsters, whose heads appear to hang down in front and wobble as they rise, and with curious humps on their backs. The amber-reef fisher has to work in a lying and recumbent posture, so that the ordinary diver's equipment has had to be modified to suit him. Instead of the helmet, with its barred goggle eyes, being screwed on to his shoulders in an upright position, it projects forward, to relieve the neck and collar of the strain, and hangs down in front, so that his appearance as he rises from the deep, with the water dripping from his pendant top covering, is ludicrously like some sea animal, with a snoutless head that waggles solemnly from side to side. To the back of each is strapped what looks, at a first glance, like a soldier's knapsack, but is really a metal box, with an upper cylinder, constituting an air reserve, so arranged as to supply the diver at each inspiration with exactly the quantum of air he needs, and no more; while the expired carbonic acid gas rises, through another passage to the upper atmosphere. As the divers are hauled into the boats, the overseer takes from a receptacle round the waist any amber blocks that have been attached to it. After a few minutes' rest, the fisher descends, and resumes his work below. With stout crowbar and pronged iron he pokes about among the masses of weed, and sand, and stone that form the sea bottom, until he detects the presence of an amber mass. Or, crawling about on hands and knees, he loosens from the sea floor any blocks recent storms may have partially dislodged. Often these pieces require two, or even three, divers to move them, and gigantic slabs have, now and again, been found, that resisted even the united strength of three pair of hands to disentangle from the masses of stone and weed encumbering them. The fishers remain down five hours a day, and though in autumn the sea is icy cold, so severe is the strain of working under water that they rise to the surface bathed in perspiration.

When gathered, the amber is sorted according to colour and size. Pale, straw-tinted pieces go to the pipe-makers of Constantinople, North Africa and the Levant, and are made into mouth-pieces; the light bone-coloured and veined slabs are sent to grace the classic busts of the peasant women of central Italy; while the full yellow, sherry-tinted specimens find their way to the South Sea Islands and Inner Africa, where, worked up into necklets and beads, they are destined to adorn the ebony necks of the dusky beauties of Otaheite or Timbuctoo. Water amber is nearly all transparent and glasslike; earth amber—that is to say, amber obtained by digging—is of the smoky kind, more white than yellow, and quite opaque. Only the finer sorts are obtained from the "reef" off Brüster-ort, and these fetch on an average about five thalers, that is fifteen shillings, per pound. Large blocks fetch proportionally higher prices than smaller slabs, while exceptional specimens, of unusual size, run to fancy prices altogether—fifteen, and even thirty pounds sterling, it is said, having been paid for such samples. Most of the ordinary qualities of amber go to Leghorn and Venice. In return, north-east Prussia takes coral gathered from the reefs of the Adriatic. This is due to the fact that in the Baltic provinces of Germany and the neighbourhood, custom ordains that brides and young married women shall appear in a curious ornament of red coral. It is made by stringing coral beads on a stout silken cord, the smallest beads procurable coming first, larger next, then still larger ones, until the largest of all are reached. This ornament is worn in such a way that the smaller beads are round the neck, the next in size round the shoulders, while the largest cover the bust, and depend down the back. The cost of a perfect string of coral like this is over fifty pounds sterling, and all well-to-do Polish families consider it an indispensable item of a bride's outfit. Hence the demand for coral is pretty regular and constant in the north; and in this way it comes that, practically speaking, the produce of the Italian coral reefs is exchanged for the yield of the Baltic amber fishery.

CONTENTS OF THE ARIL OF THE NUTMEG.

Herr A. Tschirch states that the aril of *Myristica fragrans* furnishes a remarkably good illustration of the presence of amylodextrin as a normal cell-content in the place of starch. It is distinguished from true starch by being stained reddish-brown instead of blue by an aqueous solution of iodine. The grains of amylodextrin are from 2 to 10 μ in diameter, and do not appear to contain even a nucleus of starch. They have usually somewhat the form of a rod, and are often curved or coiled; less often they are roundish or disc-shaped; they do not usually exhibit any evident stratification. The matrix in which the grains of amylodextrin are imbedded consists chiefly of oil, but contains also small quantities of a protoplasmic substance which is stained by rosin and some dextrin, with a small quantity of sugar. Scattered through the parenchymatous tissue are a large number of round oil-cells, 65-88 μ in diameter. They have suberized cell-walls, and in the mace of commerce are partially filled by an oily or resinous mass of a yellow or yellowish-brown colour, the yellowish-red pigment of which can be extracted by alcohol. When living the aril has an intense bright red colour, and the pigment must therefore undergo some change in drying.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 24, 1888.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

POISON REGULATIONS.

SEVERAL letters have been received on the subject of Poison Regulations, some of which we should have been glad to publish had it not been that the writers did not append their names to the letters and because it appeared desirable in regard to this subject to adhere to the principle of not inserting anonymous communications. There seems to be reason for believing that the action taken by the Council of the Pharmaceutical Society in 1871 in giving effect to the decision arrived at by the Society in General Meeting has been somewhat forgotten. It seems therefore appropriate to reproduce the regulations for the keeping, selling and dispensing of poisons which were then adopted as *recommendations* by the Society, and afterwards forwarded by order of the Council to every person on the Register, with the urgent request of the Council for their universal adoption.

"*Recommendations by the Pharmaceutical Society of Great Britain for the Keeping, Dispensing, and Selling of Poisons.*

"1. That in the keeping of poisons each bottle, vessel, box, or package containing a poison be labelled with the name of the article, and also with some distinctive mark indicating that it contains poison.

"2. Also that in the keeping of poisons, each poison be kept on one or other of the following systems, viz.,

"(*a*) In a bottle or vessel tied over, capped, locked, or otherwise secured in a manner different from that in which bottles or vessels containing ordinary articles are secured in the same warehouse, shop, or dispensary; or

"(*b*) In a bottle or vessel rendered distinguishable by touch from the bottles or vessels in which ordinary articles are kept in the same warehouse, shop, or dispensary; or

"(*c*) In a bottle, vessel, box, or package kept in a room or cupboard set apart for dangerous articles.

"3. That in the dispensing and selling of poisons all liniments, embrocations, and lotions containing poison be sent out in bottles rendered distinguishable by touch from ordinary medicine bottles, and that there also be affixed to each such bottle (in addition to the name of the article, and to any particular instructions for its use) a label giving notice that the contents of the bottle are not to be taken internally."

It was the opinion of many members of the Society that by the action then taken the matter of poison regulations was sufficiently and finally disposed of, so far as pharmaceutical chemists and chemists and druggists are concerned, though it is true that others were of a different opinion. It is impossible to say whether any change in the balance of opinion on this subject has since taken place, but in any case it does not seem to be the function of the Council as the Executive of the Society to disturb the deliberate conclusion arrived at in 1871 by the members assembled in general meeting. It is competent for any member of the Society to raise a discussion on the subject at the Annual or a Special General Meeting of the Society, and this would seem to be the more constitutional mode of proceeding.

THERAPEUTICS IN THE LIGHT OF STATISTICS.

UNDER the title, "La thérapeutique jugée par les chiffres," Messrs. BOURGOIN and DE BEURMANN have recently published a number of statistics representing the medicines supplied to the hospitals of Paris by the Pharmacie Centrale during a period of ten years. The figures possess certain interest as reflecting some of the modifications that have taken place in one department of French medical practice during a period remarkable for the development of antiseptic views in the treatment of disease and in surgery; but they are deficient in that they only extend to the end of the year 1885 and thus leave uncovered a period of three years, during which some new medicines have made enormous strides in medical favour, whilst others have almost dropped out of memory. The introduction of antiseptic treatment into therapeutiques proved, as might be expected, the circumstance most far reaching in affecting the choice of medicines during the decade. In 1876 the entire consumption of carbolic acid in the Paris hospitals was 369 kilograms; in 1885 it was 11,217 kilograms. In like manner the demand for boracic acid rose from 10 to 1909 kilograms; for potassium permanganate from 8·350 to 28 kilograms; and for thymic acid from 250 grams to 12·420 kilograms. Thymol appeared first on the books in 1880, when the amount used was 1·250 kilogram, which in 1885 had grown to 3·950 kilograms. Corrosive sublimate and iodoform also showed a marked advance in favour, the demand for the former increasing from 102 to 314 kilograms, and of the latter from 22 to 353 kilograms. Whilst, however, the growth in the demand for the foregoing was steadily progressive, that for salicylic acid and sodium salicylate manifested considerable oscillations. In 1876 the demand for salicylic acid was 20 kilograms, which increased next year to 63 kilograms; but by 1879 it had fallen to 5·6 kilograms, and although there was a partial recovery it only reached 7 kilograms in 1885. Sodium salicylate commenced in 1877 with 182 kilograms, reached its highest point in 1882, and stood at 355 kilograms in 1885. Bismuth salicylate appears to be replacing the subnitrate to a considerable extent in the antiseptic treatment of diarrhœa, the quantity used in the hospitals in 1885 being 18 kilograms.

Notwithstanding quinine has now so many rivals the demand for quinine sulphate in 1885 (70 kilograms) was greatly in advance of what it was in 1876 (47·290 kilograms). But the figures fail here at a very interesting conjunction. The highest point was reached in 1882 (88 kilograms). During the last three years of the decade there was a decided decrease in the consumption, and the question naturally arises in view of the increased number of antipyretics whether this falling off has been continuous during the last three years. Preparations of iron maintained during the ten years a practically stationary position, the favourite preparations being the lactate, potassio-tartrate and carbonate. Syrup of iodide of iron increased in demand considerably, but on the other hand iodide of iron itself dropped out of use. The two arsenical preparations most in use in the hospitals were granules of sodium arseniate and Fowler's solution, the demand for both increasing steadily. Lithium carbonate also appears to have grown in favour in Paris hospital practice, two kilograms having been used in 1885, a fair quantity considering that the ordinary dose does not exceed 25 or 30 centigrams. The consumption of purgatives—saline, vegetable and drastic— remained nearly uniform, but it is thought that signs were not wanting of a reaction against a routine prescribing of such medicines. In typhoid fever, for example, it may be better treatment to introduce agents to disinfect the intestine rather than simple evacuants. Alcoholic preparations, which during the preceding decade and up to the year 1880 had shown a regular advance in consumption, after that date appreciably decreased in favour, a result that is attributed to a change in views as to the administration of tonics.

Anæsthetics, both ether and chloroform, showed a steadily increasing consumption, the demand for each having practically doubled in the ten years. Opium maintained its position, but morphine increased in demand from 11 kilograms in 1876 to 17 kilograms in 1885. The demand for chloral hydrate also increased steadily through the whole period, notwithstanding the augmenting use of the bromides, that of potassium having more than doubled during the same time. Belladonna, stramonium and henbane maintained their position; aconite and aconitine showed considerable fluctuations, and conium and conicine varied still more from year to year. Digitalin fell almost out of demand, and jaborandi and pilocarpine were less in request at the end of the decade than at the beginning. The above represent briefly the principal items in Messrs. Bourgoin and Beurmann's statistics, which although applying to a relatively limited field, have the value of being complete as far as they go, since they represent all the medicines consumed in the Paris hospitals during the ten years specified.

INFLUENCE OF PRELIMINARY EXAMINATION ON PHARMACEUTICAL APPRENTICES.

Incidentally to the collection of statistics concerning the results of the examinations of pharmaceutical assistants in Germany during the years 1885, 1886 and 1887 for the purpose of a report required by the Council of the German Apotheker-Verein, Herr Bellingrodt has ascertained that in the Düsseldorf district there have been during that period seventy-three candidates for examination, and that out of the number, sixty-eight were successful, while five, or only 6·8 per cent., were rejected by the examiners. A more extended inquiry as to the entire number of pharmaceutical students that have presented themselves for examination since the time of the introduction of regulations as to examinations in November, 1875, showed that the proportion of failures during the twelve years amounted on the average to 10·3 per cent., and for the period from 1875 to 1884 inclusive it was 11·5 per cent., so that the proportion of failures has decreased since 1885 by as much as 40·9 per cent. This very remarkable result is justly characterized as being highly satisfactory, especially when it is remembered that during the twelve years referred to the examinations have been conducted by the same examiners, and that meanwhile the demands made upon the candidates have certainly not been reduced, but more probably increased. This result is also held to be a most striking proof of the salutary and beneficial influence of the system of preliminary examination of pharmaceutical students introduced in the Düsseldorf district in the autumn of 1883. That system has been very much condemned in various quarters, but where it has been tried experience testifies in its favour. In the Düsseldorf district at least it is found that these preliminary examinations are of great value, and it is the general opinion that a system based upon the principle of self-help, and unanimously supported and promoted by members of the craft for the thorough and appropriate training of apprentices, is much to be preferred over the official surveillance through the district medical inspectors.

We have just received official information from the General Medical Council Office that a third reprint of the British Pharmacopœia has been issued, and that copies may be had either at that office or from Messrs. Spottiswoode, Gracechurch Street, E.C., the Council's publishers. We understand that this reprint contains some important interpolations as to synonyms.

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The returns of imports into Canton during the year 1887 includes 4846 dozen bottles of worm tablets. In commenting upon this fact and the favour in which foreign medicines are held in China, Mr. Consul Alabaster quotes pills and aniline dyes as among the articles which are in future more likely to yield fortunes to the merchants than the old-fashioned staples.

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At the meeting of the Chemists' Assistants' Association on Thursday next, the 29th inst., a paper will be read on "Photography," by Mr. F. V. Butterfield.

Provincial Transactions.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The first ordinary monthly meeting of the session was held at the Chemical Club Rooms, Victoria Hotel, on Wednesday evening, November 14. Mr. F. Baden Benger in the chair.

The following paper was read—

Plant Structure; an Introduction to Vegetable Pharmacognosy.

BY W. ELBORNE, F.L.S.,

Assistant Lecturer in Materia Medica and Pharmacy, Owens College.

By the term pharmacognosy is comprehended a scientific knowledge of the actual substances constituting the materia medica, its scope being to scrutinize and appropriate all scientific evidence relating thereto. For example, with reference to a plant substance, among desiderata pertaining to its vegetable pharmacognosy are, its botany and microscopic structure, geographical distribution, cultivation, collection and preparation, chemical constituents and composition, its falsifications and substitutions and even history.

In an address* delivered before the Manchester Pharmacy Students' Association twelve months ago, I alluded to the subject of plant structure as bearing upon pharmacognosy in the following terms:—Upon the practical knowledge of botany, a practical acquaintance with the elementary structures of which plants are built up, more especially those of the dicotyledons, from which by far the greater proportion of vegetable drugs are drawn, the right knowledge of vegetable pharmacognosy in the detection and identification of substitutions and falsifications very much depends.

The fragment of this exhaustive subject which I have chosen for this evening's consideration is a brief summary regarding, in contradistinction to the tissues, the vegetable cell.

The substance of plants is built up of structures termed cells, which, like the external form of the plant, have likewise undergone regular changes in size and structure according to their individual life-history. Since the cells of plants in the very young state differ but slightly from one another these differences are best seen in cells which have passed through their earlier stages, as found in such organs as young stems, roots, leaves and fruits.

When the cell has reached its stage of greatest activity it will generally be found to consist of three concentrically arranged parts: (1) the firm elastic outer wall, the cell wall; (2) the soft inelastic semifluid albuminous substance inside the wall, called protoplasm, in which is generally imbedded a more solid rounded body, the nucleus; and (3) the watery fluid occupying the centre, the cell sap, which during the growth of the cell ultimately coalesces, forming drops or vacuoles.

The substance of the cell wall, cellulose with varying proportions of water and inorganic matter, is secreted from the protoplasm, its mode of growth varying according to the specific function which it has to fulfil in the economy of the plant. Its growth only continues so long as it is in immediate contact with the protoplasm, it being effected by the intercalation of additional solid matter, between those already existing in the membrane, the process being termed intussusception. Cells during growth assume a variety of forms, such as hexagonal, stellate, tabular, elongated, fusiform, etc.; the manner in which the walls become thickened also takes place in a very irregular manner, affording characteristic appearances in the form of annular or spiral ridges; or, if the wall is very thick, channels or fissures may be left passing entirely through the wall into the cavity of the cell, and thus giving it a dotted or pitted appearance. The thickenings also generally assume a striated appearance, varying according to their density. Cellulose when treated with Schulze's solution or with iodine and sulphuric acid (diluted with an equal volume of water) assumes a blue colour. Chemical changes may also occur in the cell wall attended with different physical properties. It may undergo: (1) the cuticular change, or become suberous (as in the cuticle and in cork); turned yellow with Schulze's solution. In true cork cells the wall is entirely changed, whereas in the cuticle of the epidermis, spores and pollen grains, only the outer part becomes cuticularized, the inner part remaining unaltered cellulose. (2) Lignification, the cellulose becoming converted into lignin, hard and inelastic; yellow with Schulze's solution. (3) Degradation, or the mucilaginous change, giving it a gelatinous consistence, to which such substances as gum arabic and tragacanth owe their origin. Mineral matter, such as silica and calcium carbonate, is also largely deposited in the cell wall. To observe colourless transparent cell walls, cut longitudinal sections of the pith of a young twig of elder and mount in water; separate sections treated with aqueous solution of iodine assume a yellowish colour, with Schulze's solution a violet colour—reactions characteristic of cellulose, of which the cell-walls of parenchymatous cells are composed. The osmotic property (plasmolysis) of the cell-walls is well seen in a section of fresh beetroot mounted in water; on treating with a saturated solution of common salt the red-coloured sap contained in the then cellulose walls commences to shrink, due to the withdrawal of water, and by contraction finally collects in the centre of the cells, their normal appearance being restored by immersion in water. Cell-walls which have become cuticularized or tuberous may be well observed in the outermost well-defined layer of epidermal cells (cuticle) of a section of small stem of the sunflower, or a foliage leaf of either a pine or of maize (*Zea Mays*). True suber or cork cells, occurring in one or more layers beneath the cuticle and consisting of empty thin-walled cells may be conveniently studied in a section of a young twig of elm; cork cells resist the action of ordinary reagents and are practically impermeable to air and water. Examining another section of elm, the cell-walls which have undergone lignification may be identified by their assuming a bright red colour on treatment with a solution of phloroglucin acidulated with hydrochloric acid. Lignification in structures belonging to the coniferæ is identified with a solution of carbolic acid in hydrochloric acid, where, after exposure to sunlight, such cells assume a bright green colour (the reaction being due to the presence of coniferin).

Protoplasm is a soft plastic combination of proteid or albuminous matters, water, and small quantities of mineral constituents. It is the seat of all vital processes of the cell, from which are secreted numerous substances of different chemical and physical properties, such as oil, chlorophyll, crystalloids, aleurone grains, starch and fat, in which case it assumes a more or less granular appearance. Living protoplasm does not readily absorb colouring matter dissolved in water nor allow its passage. When the granular protoplasm is contained in an outer layer free from granules, the latter is termed ectoplasm; but if by the coalescence of the cell sap into vacuoles, the protoplasm forms a thin layer just within the cell-wall, it is called the primordial utricle.

Examining a transverse section of a young twig of pine, the parenchymatous cells of the pith will be observed to be nearly filled with protoplasm, which latter in common with all nitrogenous substances is

* *Pharm. Journ.*, Nov. 26, 1887.

stained yellow with either potash, iodine, or Schulze's solution, violet with Fehling's solution.

Among the substances contained in the protoplasm are chlorophyll, which in the higher plants occurs in the form of granules in certain cells, such as those of the leaf and young portions of the stem, constituting the green colouring matter of plants. Each granule consists of two parts, the colouring matter and its colourless protoplasmic vehicle; the former may be readily removed by such solvents as benzol, ether, alcohol, chloroform, or essential and fixed oils, leaving the latter colourless material behind. These chlorophyll corpuscles grow and increase in number by divisions of their substance. In the lower orders of plants, as in certain algæ and lichens, the corpuscles do not always occur in the form of granules, but the protoplasm in addition to the green colouring matter contains also red, blue and yellow substances soluble in water, causing by their admixture verdigris green, red, brown or buff colours of those plants, with which latter must not be confounded the autumnal and fructescent tints, due to the degradation of the chlorophyll. Solution of chlorophyll is bright green by transmitted and red by reflected light, the spectrum showing seven absorption-bands, the strongest being between the lines B and C of the solar spectrum. When plants are deprived of light they undergo etiolation, that is, the granules are formed, but not the green colouring matter. The same is said to occur when the plant is deprived of iron as a constituent of its mineral food, it then being designated chloratic.

The process of assimilation, or the fixing of carbon derived from the atmosphere, depends upon the action of the chlorophyll upon carbonic acid gas in the presence of water under the influence of sunlight; notably starch granules are developed thereby, which may be readily recognized by the application of solution of iodine after abstraction of the green colouring matter by alcohol. The colour substances in the petals of flowers are termed chromatophores.

In the oblong cells beneath the epidermis in the section of sunflower stem, numerous green chlorophyll granules will be observed, from which upon treatment with strong alcohol, the green colour will be dissolved out; after this treatment any starch grains which may have been inclosed will become evident by their assuming a blue colour on adding iodine solution. A thin section of any green leaf would yield similar reactions.

Portions of the protoplasm sometimes assume a definite crystalline appearance not to be confounded with the true inorganic crystals occurring in the cell sap. Their substance consists essentially of protoplasm, and they are distinguished from the crystals of the cell sap by their capability of imbibing water, and swelling up under the influence of such reagents as caustic potash. They assume the forms of octahedra, tetrahedra and rhombohedra, and occur largely in the tubes of certain kinds of potatoes, in fatty seeds such as those of castor oil and Brazil nuts. Sections of the endosperm of castor oil seeds are best mounted temporarily in glycerine and water.

Aleurone grains are granules of a proteid nature found chiefly in ripe seeds (in the endosperm and cotyledons) generally associated with starch and oily matter. They often contain protoplasmic crystalloids, together with small rounded bodies called globoids, the latter consisting of a combination of phosphoric acid with lime and magnesium. For viewing aleurone grains sections are best mounted in strong glycerine; they are soluble in caustic potash, globoids insoluble, but soluble in acetic acid. In castor oil seeds the aleurone grains contain both protoplasmic crystalloids and globoids.

Protoplasmic crystalloids may be conveniently studied in the outer cells of a section of a potato tuber, where they occur as cubical crystals, swelling up and apparently soluble in caustic potash, and capable of being stained yellow with iodine, reactions distinguishing them from crystals of mineral origin, which latter are not affected with these reagents. Protoplasmic crystalloids may also be observed in a section of fresh dandelion root, constituting the substance termed inulin.

Starch occurs in the form of granules of a concentrically stratified structure consisting of starch, water, and a small percentage of incombustible mineral matter, found in certain cells of almost all plants. They occur largely in tubers and other reserve receptacles and in the seeds of cereals. Starch is a carbohydrate isomeric with cellulose, to which latter it bears great resemblance in properties. A starch grain is composed essentially of two parts, a thin outer envelope or membrane termed starch cellulose (forming about 5 per cent. of the grain), and of a semi-solid substance contained within termed granulose, more easily soluble, and in the presence of water assuming a beautiful coloration with iodine. Starch is very widely distributed in plants, the granules often assuming characteristic appearances; their growth takes place by intussusception, generally in concentric rings arranged round an eccentric nucleus or hilum. Starch grains are insoluble in cold water, but when crushed a small portion of the granulose is dissolved. Caustic potash solution causes intense swelling. Water at 60° C. causes the rupture of the starch cellulose with the escape of the contents, leaving the membrane as a skeleton.

To observe starch grains lightly scrape the freshly-cut surface of a raw potato and examine the scrapings mounted in water under a high power, and notice the ovoid bodies, which, treated with iodine, turn blue.

The cell-sap is constituted of an aqueous solution of variable substances, such as mineral salts, cane and grape sugar, tannin and other glucosides, vegetable acids like citric and malic, and many colouring matters. It pervades the whole cell (the cell-wall protoplasm and all bodies contained in it), occasionally separating into vacuoles. Most substances elaborated by the protoplasm are found in it either in solution or in visible and definite forms; mineral constituents especially are apt to crystallize out, and in several instances become deposited upon the cell-walls. In certain plants, as in the hypodermal cells of *Ficus elastica*, a peculiar ingrowth of the cell-wall takes place, which becomes coated in a globular manner with crystals of calcium carbonate; such globular masses are termed crystalithes. All other crystals hitherto observed have been found to consist of calcium oxalate, which crystallizes in two systems, octahedral and acicular (clinorhombic), according to the amount of water they contain. Acicular crystals of calcium oxalate are termed raphides; they are secondary products of metastasis, the excess of calcium salts absorbed from the soil being thus eliminated.

After an interesting discussion, in which the Chairman, Messrs. Husband, Lane, Kemp and Wilson took part, the proceedings terminated.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The first general monthly meeting of the present session was held in the Society's rooms, Fitzalan Square, on Wednesday evening, Nov. 14, the President, Mr. Learoyd, in the chair.

The minutes of the inaugural meeting having been read and confirmed, Mr. J. H. Worrall, F.C.S., F.I.C., was called upon to read a paper on—

Michael Faraday.

BY J. H. WORRALL, F.C.S., F.I.C.

Such have been the mental aberrations exhibited by men of genius, including on the one hand mere eccentric idiosyncrasies and on the other actual transgression of the laws of sanity, that the statement has been made to the effect that "a diseased brain is the physical substratum of genius and that the possession of exalted mental endowments carries with it special liabilities to the action of the strong disintegrating forces which environ us." Almost innumerable are the instances which can be adduced in support of this statement, but amongst the many may be mentioned the names of Schumann, Blake, "to whom the realities of the world were but the dissolving forms of his own consciousness," Cowper, Coleridge, Tasso, "who gave Goethe the opportunity of picturing the physiological drama," Auguste Comte, Swedenborg, "whose prolific mind teemed with fancies and speculations, contradictions and absurdities," and Charles Lamb, whose "diluted insanity" is said to have cast an enduring shadow over his life.

In contradistinction to these views, Dr. Maudsley states that "a large genius is plainly not in the least akin to madness, but between these widely separated conditions a series of connections is made by persons who stand out from the throng of men by the possession of special talents in particular lines of development, and it is they who displaying a mixture of madness and genius at the same time, have given rise to the opinion that great wit is allied to madness."

It is moreover evident that certain men of genius have been wrongly placed in the catalogue of mental aberration, because at certain momentous periods of their life their conduct has been utterly mistaken; such was the case of Edmund Burke, who was said to have given proof of the degeneracy of his magnificent intellect, because he was found weeping whilst leaning on the neck of his dead son's favourite horse.

I have prefaced this paper with these few remarks, because they relate to a subject of the greatest interest and importance when considering the life of any great man, and because the man whose character I have the honour of bringing before this society this evening, stands unique as possessed of unquestioned genius, and therefore whose life is fraught with the deepest meaning to all earnest students of psychology. It is not my intention to detail the biography of Michael Faraday; this would be impossible in the short space of a single paper, even if I had wished it; but I do wish to point out with as much force as I am able the successive stages in the mental growth of one who, like a Saul, in intellect towered head and shoulders above his fellows, yet who in worldly spirit sat humbly at the footstool of his Great Teacher, and thus learnt the lesson which his own life so nobly repeated to all who have ears to hear.

As the successive stages of our mental growth are often intimately related to the various positions we occupy in life, it appeared to me not uninteresting, in unfolding the principles which underlie the life of Michael Faraday, to describe those seven positions, which in a real sense each human soul occupies in its life's progress. And first we see the child in its *cradle*. It scarcely needs the life of Faraday to controvert the idea that real worth, either of intellect or morals, is dependent on the lengthened pedigree of an aristocratic house; yet the blacksmith's son is pre-eminently an illustration of the finest genius, starting suddenly from the lowest ranks, innocent alike of Norman, Saxon, or Danish lineage. The most ancient records of the Faraday family are to be found in the parish register of the village of Clapham, Yorkshire, where mention is made of Michael's grandparents, Richard and Elizabeth, whose third child, James, was born in May 8, 1761. After serving his apprenticeship to a blacksmith, he, in 1786, married Margaret Hastwell, a farmer's daughter, of Mallestang, near Kirkby Stephen. Not long afterwards they removed to London, and abode in Gilbert Street, Newington Butts, where on September 22, 1791, their third child, Michael, first saw the light. In Gilbert Street the cradle of the future philosopher ceased to rock,

> And Nature, the old nurse, took
> The child upon her knee,
> Saying, "Here is a story book
> Thy Father hath written for thee.
>
> "Come, wander with me," she said,
> "Into regions yet untrod,
> And read what is still unread
> In the manuscripts of God."

And so he slowly climbed into the *school desk*. In 1796 the family removed to rooms situated over a coach-house in Jacob's Well Mews, Charles Street. It was one of young Michael's duties to take care of his little sister, Margaret, and in after years he lovingly remembered tending her in Manchester Square, as also recreating himself by playing at marbles in Spanish Place. During these early days his education, according to the ordinary acceptation of that most ill-used phrase, consisted in acquiring the mere rudiments of reading, writing and arithmetic at a common day-school; but his real education was obtained at the school-desk unscoured by penknife-cut monograms, and uninvestigated by the pedagogue's watchful eye. Light and joyful as the lark when it rises from the dew-gemmed grass of early morning, he mounted into the clear heaven above, gazing on the wide-spread creation around him, and pouring forth his clear notes of praise to the Creator of all. And lest this should to some sound like unreasoning flattery, I will hasten to prove the statement by subsequent facts.

When Michael was thirteen years of age his parents removed to Blandford Street, and after a year's trial he became the apprentice to one Mr. Rieban, a bookseller and bookbinder at No. 2 of the same street. Here the embryo philosopher read books as well as binding and selling them, and thus became especially acquainted with Watts' 'Inprovement of the Mind,' Mrs. Marcel's 'Conversations on Chemistry,' and the article on "Electricity" in the Encyclopœdia Britannica.

Thus gradually and naturally his education went on within, whilst he undistractedly absorbed the influence from without. Amongst the latter, and by no means the least, were the lectures of a Mr. Taburn on Natural Philosophy; but the entrance fee to these discourses was the extensive sum of 1*s*. per lecture, which was completely beyond the state of young Michael's finances; however, his elder brother kindly came to his aid and disbursed the amount. At certain memorable seasons also a star shone through the upper mist of the scientific world in the person of Sir H. Davy, when, by the kindness of some friends, an entrance was gained to one of the lectures at the Royal Institution, and there sitting in the gallery just over the clock the hungry soul of young Faraday devoured the fragments of science which were handed out.

I fancy there were a goodly number of great personages whom Faraday met in upper life, and whom it is just possible to meet at the present day, who would have greatly benefited could they have sat for a time at the youthful student's school-desk. Observing these people he said, "It is the highly educated men I find coming to us again and again, and asking the most simple question in chemistry or mechanics; and when we speak of such things as the conservation of force, the permanency of matter, the unchangeability of the laws of nature, they are far from comprehending them, though they have relation to us in every action of our lives. Many of these instructed persons are as

far from having the power of judging of these things as if their minds had never been trained."

Who shall have the temerity to say, even in these days of academies, colleges, and universities, that Faraday's mind was not as truly and liberally trained as if he had been subjected to a variety of masters, a host of tutors, a bevy of professors, several well-read private coaches, had satisfied a number of examiners or had taken honours with his degree.

To verify this eulogium and to show the position to which his education had now brought him, I cannot do better than quote a passage from one of those truly admirable letters which Faraday was constantly writing at this period to his young friend Mr. Abbott. The letter is dated, September 9, 1812, so that the writer was then nearly twenty-one years of age.

"You wrong me, dear A., if you suppose I think you obstinate for not coinciding in my opinion immediately; on the contrary, I conceive it to be but proper retention. I should be sorry, indeed, were you to give up your opinion without being convinced of error in it, and should consider it as a mark of fickleness in you that I did not expect. It is not for me to affirm that I am right or you wrong; speaking impartially, I can as well say that I am wrong and you right, or that we both are wrong, and a third right. I am not so self-opinionated as to suppose that my judgment and perception in this or other matters are better or clearer than that of other persons; nor do I mean to affirm that this is the true theory in reality, but only that my judgment conceives it to be so. Judgments sometimes oppose each other, as in this case, and as there cannot be two opposing facts in nature so there cannot be two opposing facts in the intellectual world; consequently when judgments oppose, one must be wrong—one must be false; and mine may be so for aught I can tell. I am not of a superior nature to estimate exactly the strength and correctness of my own and other men's understanding, and will assure you, Abbott, that I am far from being convinced that my own is always right. I have given you the theory —not as the true one, but as the one which appears true to me—and when I perceive errors in it, I will immediately renounce it in part or wholly as my judgment may direct."

It is not surprising that the young soul who could breathe out such an inspiration as this, should transform the base metals of commonplace into the sterling gold of a life purpose, or should light with the fine halo of a fervid imagination the usual misty monotony of the shop and *counter*. The latter position Faraday occupied for nine years, commencing in 1804 by an apprenticeship to Mr. Rieban. The indenture, signed after the boy had been one year on trial, contains the remarkable line, "In consideration of his faithful service no premium is given." Amongst other duties, he carried out the newspapers, but the monotonous daily rounds, instead of causing his brain to stagnate, gave him opportunities of asking both himself and others the curious questions he was so fond of asking at this time. As an instance, one day, after knocking at a door he had to wait rather longer than usual whilst it pleased the inhabitants to open it to "that newspaper boy," in order to amuse himself he put his head through one of the spaces between the iron bars that made a separation from the adjoining house, and questioned himself as to which side of the railings he was on—a difficult question to answer. The door behind opened, and drawing suddenly back, he struck himself a heavy blow; his nose began to bleed, and for that time his curious question remained unanswered.

On October 8, 1812, he became journeyman bookbinder to Mr. De la Roche. Unlike his former master, this man was very passionate, and under these circumstances Faraday's spirit began to yearn for a more congenial sphere. As other aspirants for fame have done before and since, so now the young bookbinder in his simplicity thought to enter the elysium of his desires by applying at the highest shrine. He wrote to the President of the Royal Society, Sir Joseph Banks, and received—no answer. Still the impulse within him would not let him rest, despite the rebuff. This time the endeavour for intellectual liberty was made by means of a letter to Sir H. Davy, then Professor of Chemistry at the Royal Institution. The result was an interview, at which Davy advised him to stick to his bookbinding, and told him that "science was a harsh mistress, and in a pecuniary point of view but poorly rewarding those who devoted themselves to her service."

Nevertheless it so happened after these disappointments that the assistant at the Royal Institution misbehaved himself, and Davy remembered the intelligent young bookbinder. Faraday was communicated with, and to his great joy he (metaphorically) left the counter and shop on March 1, 1813, and entered the *laboratory* of the Royal Institution, being engaged at the rate of 25s. per week and the use of two rooms. How deeply interesting would those first experiments be to the earnest student. He would now be constantly working amongst the apparatus, and with the ideas which formerly were only wondered at afar off, or slightly touched during some odd evening hour. Now we see him, at one time extracting sugar from beetroot, then making carbon bisulphide, and at another time endangering his earthly existence by experimenting with chloride of nitrogen, which had an uncomfortable way of exploding when not expected. At last, one day, Sir H. Davy had the iron mask he was wearing torn from his face and received a severe injury on the lower jaw, whilst Faraday recovered consciousness in some corner of the laboratory, and then it was thought that in future chloride of nitrogen should be left to rest in peace amongst the possibilities of latent forces.

About this time Sir H. Davy decided upon a continental visit, and kindly invited Faraday to accompany him. The invitation was readily accepted. Thus the ex-bookbinder's apprentice had his "Wanderjahr," with all its experiences, teachings, and acquaintances. But to go with him however interesting would take us too far from our present purpose; we rather stay and greet him on his return, and congratulate him on his improved appearance in erect carriage, brighter eye, and more intense fervour of thought. Now we listen to him as he gives scientific evidence in certain commercial trials; where his developing powers are being tested; then we watch him disinfecting the Millbank Penitentiary; then again we see him trying to harden steel and prevent rusting by alloying with the rare metals, whilst the boy blows the bellows till the crucibles melt; and anon he repeats and extends the experiments of Ampère on the mutual action of magnets and electric currents, and when after months of work the wire begins to move round the magnet, and the magnet round the wire, he dances round with joy and cries "There they go! there they go!"

But that we may really enter into a true appreciation of his work, let us watch him during the whole of one day at the Royal Institution. He has carefully thought out beforehand his subject, and has planned his mode of attack. If some new piece of apparatus is needed, he has made a drawing of it and given it to the instrument maker with a full description; if however the means of the experiment are at hand, he will have handed at least the day before a written list to his faithful henchman, Anderson, who is an old retired soldier, and has been chosen because of his military habit of strict obedience, and who moreover is not to be hurried.

After 8 hours sleep Faraday rises, in time to have breakfast at 8 o'clock; he then goes round the Institu-

tion to see that all is in order, and finally descending into the laboratory, he puts on a large white apron full of holes, and is busy among his pieces of apparatus. As he begins, his face is exceedingly grave, and during the experiment all must be exceedingly quiet. As thought after thought flashes through his brain, he twists his wires into other forms, and alters his magnets and batteries. If the experiment is proceeding successfully, he commences to hum a tune, and sometimes to rock himself sideways, balancing alternately on either foot. Then comes the gleam of satisfaction, followed however often by the doubt which requires fresh experiments devised and executed in order to be answered. There must be no tool on the table but such as he requires, and when finished with it is put away at once, or at least after the day's work is done; if the tool can be used at the place where it is kept, it is not unnecessarily removed. Probably his little niece is sitting on a footstool not far away, and now and then he turns to say a few kind words to her, or he throws a piece of potassium into some water where she delightedly watches it as it bursts into flame, and circling round and round in fiery eddies, disappears with a sharp report.

At this point some renowned *savant* may be announced. The last results which have been obtained are carefully put down on a slate and the philosopher goes upstairs to welcome his visitor and to entertain him in his hearty genial manner. He then returns to his work until 2·30 p.m., the dinner-time; after this he retires to his study and writes his letters, and then perhaps attends the council meeting of one of the learned bodies; returning home, he goes back again into the laboratory until the evening, when he finally retires upstairs and spends the time in playing games with his wife and little niece, or reading aloud from some favourite author.

And days of which this one is only a faint picture pass over the life of Michael Faraday, and each one finds him patiently but earnestly gathering the rich ears of knowledge, and as patiently binding them into golden sheaves of precious ripeness. He discovers benzol, and thus pioneers the way to the splendid series of beautiful aniline colours; then he is investigating the specific inductive capacity of bodies, the results of which have been of the greatest importance in submarine telegraphy; and again he is employing all the great powers of his mind to unravel the mysteries of magneto-electricity, and finds that its mighty force is in proportion to the *number* of lines of magnetic force which have been intersected, viz., the *area* of the intersections. Already these latter assiduous labours have been brilliantly crowned by their application to the deposition of silver, etc., upon inferior metals, and the utility and beauties of the electric light.

It was an important advance when Faraday satisfied himself that the needle of his galvanometer swam through the same arc by the same quantity of electricity, whether the quantity were condensed in a small battery or diffused over a large one.

Almost beyond conception were the results he obtained respecting the force of the electric fluid, when he found that it required for the decomposition of 1 grain of water 800,000 discharges from his large Leyden battery, and that if this amount were concentrated in a single discharge, it would be equivalent to a most powerful flash of lightning.

Yet even without these fruitful discoveries his researches on electro-chemical decomposition, the magnetization of light, and the magnetism of flame and gases would have placed his name high in the annals of science.

Living and thinking with principles that continually lifted him above the dense mists of earthly aggrandisement, and that placed him in the clear atmosphere of penetrating vision, it is no wonder that the ideas of the true worker of science are immensely above those which are generally received. "I am not one who considers that science can be honoured," he says. "I have always contended that rewards will never move the men who are most worthy of reward. When distributed they should be given for what a man has done, and not offered for what he is to do, or else talent must be considered as a thing marketable and to be bought and sold, and then down falls that high tone of mind which is the best excitement to a man of power, and will make him do more than any commonplace reward. When a man is rewarded for his deserts he honours those who grant the reward, and they give it not as a moving impulse to him, but to all those who by the reward are led to look to that man for an example."

The results of his life-thought on the higher education, of which we hear so much in these days, is worthy of the profoundest study. He says, "I will simply express my strong belief that that point of self-education which consists in teaching the mind to resist its desires and inclinations until they are proved to be right, is the most important of all, not only in things of natural philosophy, but in every department of daily life. When the different data required are in our possession, and we have succeeded in forming a clear idea of each, the mind should be instructed to *balance them* one against another, and not suffered carelessly to hasten to a conclusion. This education will require *labour*, *thought and patience* in every exercise tending to improve the judgment; but surely a thought of the prize should suffice to stimulate to the requisite exertion; and to those who reflect upon the many hours and days devoted by a lover of sweet sounds to gain a moderate facility upon a mere mechanical instrument, it ought to bring a correcting blush of shame if they feel convicted of neglecting the beautiful living instrument wherein play all the powers of the mind."

It is most fitting that we should conclude our acquaintance with Faraday's work in the laboratory by listening to him as he tells us what the true philosopher should be. "It is not the duty of a philosopher to dictate belief, and all hypothesis is more or less matter of belief; he has but to give his facts and his conclusions, and so much of the logic which connects the former with the latter as he may think necessary, and then to commit the whole to the scientific world for present, and, as he may sometimes without presumption believe, for future judgment. The philosopher should be a man willing to listen to every suggestion, but determined to judge for himself. He should not be biassed by appearances, have no favourite hypothesis, be of no school, and in doctrine have no master. He should not be a respecter of persons, but of things. Truth should be his primary object. If to these qualities be added industry, he may indeed hope to walk with the veil of the temple of nature." These last few sentences, I conceive, have no fitter place in which to be enshrined but the indelible consciousness of every searcher after truth.

From the laboratory we follow the sage of Albemarle Street, and see him as he takes his stand behind the *lecture table*, and we feel, as we watch him, that henceforth this place has been ennobled, because his genius has cast around it a halo of power and dignity which the sirocco-blasts of insatiate ambition can never disperse. With grave yet happy face, and agile step, he passes from one end of the table to the other, trying the stopper of every bottle to ensure no delay during the lecture, and arranging all his pieces of apparatus in such a way that none shall obstruct the view of the audience, and that each piece shall as much as possible suggest the order of the experiment.

Now the sound of many feet is heard, and presently the hall is crowded with a throng of expectant faces,

Perhaps it is an ordinary Friday evening, and you will see the seats filled with men of the highest eminence in every department of science, anticipating the great intellectual treat in store for them; or more interesting still it is the children's lecture, and as you gaze on the rows of young bright eager faces, and see the Prince Consort sitting in the front row with the Prince of Wales and Prince Alfred on either side of him, you wonder what can be the power that can cause all this excitement over the *dry* facts of science. You wonder, but no longer than when the lecturer commences to speak. With what inimitable skill and few simple words is the sympathy of the auditory enlisted on the side of the speaker. With graphic power the common things of everyday life are touched as with a magic wand, and immediately they become things of life, startling the listener with hitherto unknown feelings of awe and veneration, and then they unfold and expand before his gaze until he feels himself conveyed into another world—a world full of beauty and interest—a world teeming with myriads of things he never dreamed of before—a world where nothing is common or unclean, but where the majesty and sublimity of eternal harmonies are ever sounding, and where the joys of all created things ascend like a pæan of triumph toward *heaven*—it is the world, nay, the universe of *thought*. As he speaks, he shows; as words of power fall from his lips, acts of power seem to grow beneath his hand. Each illustration has been devised with care and is executed with unerring certainty. The eloquence of his voice is great, but it is equalled by the eloquence of his hand. As we listen to him and look at him we intuitively assent to the title which has been given to him, and which he well deserves—a title which transcends all other earthly titles—*Prince of Experimentalists.*

The lecture is finished: the deep sigh of suspended attention is succeeded by the prolonged sound of applause, and once more has Faraday faithfully fulfilled his mission *on earth.* When we next see him, it is early morning, and the noises in the streets of London do not sound so deafening as on ordinary days. Quietly walking along the streets leading to Red Cross Street are a lady and gentleman and a little girl. They pass down Red Cross Street and into Paul's Alley, and finally enter a small, unpretentious building which is being quickly filled by a number of quiet, earnest-looking people. The lady and gentleman whom we have been following are Professor Michael Faraday and his wife, and the little girl is their neice; the day is Sunday, and the place is the little church of the Sandemanians. Few people have ever heard the name of this obscure sect, and it might have remained in obscurity, but that the poor blacksmith's son was a member, and when he became one of England's greatest philosophers he remained true to the church of his father. The church itself is remarkable for the purity and simplicity of its teachings, holding that "the Bible alone is the sole and sufficient guide for each individual at all times and in all circumstances." But hush! the congregation is now silently seated and waiting for the preacher to commence. Slowly he rises to his feet in *the pulpit* and begins to read and reverently expound some portion of the Scriptures. The voice and figure of the reader most forcibly remind us of the lecturer who was thrilling the fashionable audience at the Royal Institution the other night. Yes, there can be no mistake, it is he. But listen; he has announced his text, and is commencing his discourse. It seems to me as though this morning all his sermons are condensed in one, and that he is preaching the sermon of his life.

"I should be glad," he says, "I should be glad to think that high mental powers ensured something like a high moral sense, but I have often been grieved to see the contrary; as also, on the other hand, my spirit has been cheered by observing in some lowly and uninstructed creature such a healthful, honourable and dignified mind as made me in love with human nature." "Let no one suppose for a moment that the self-education I am about to commend in respect of the things of this life extends to any consideration of the hope set before us, as if man by reasoning could find out God. I claim an absolute distinction between religious and ordinary belief. I shall be reproached with the weakness of refusing to apply those mental operations which I think good in respect of high things to the very highest. I am content to bear the reproach. Yet even in earthly matters, I believe that the invisible things of Him from the creation of the world are clearly seen, being understood by the things that are made, even His eternal power and Godhead; and I have never seen anything incompatible between those things of man which can be known by the spirit of man which is within him, and those higher things concerning his future which he cannot know by that spirit."

And now it is as though the preacher has reached the summit of his theme, where even his great mind is overwhelmed as the expansive landscape of creation lies before him; yet, ennobled by the contemplation of what he knows, he stands on the mount of reflection and proclaims his legacy to all future time.

"When I consider the multitude of associated forces which are diffused through nature, when I think of that calm and tranquil balancing of their energies which enables elements most powerful in themselves, most destructive to the world's creatures, to dwell associated together, and be made subservient to the wants of creation, I rise from the contemplation more than ever impressed with the wisdom, the beneficence and grandeur beyond our language to express, of the Great Disposer of all!"

The Grave.—The preacher's voice is silent. On August 25, 1867, the greatest experimentalist in physical science that England, perhaps (as one has said) the world, has ever seen, quietly slept the sleep of the just, and his spirit winged its flight to drink deeper draughts from that fountain of knowledge and truth at which he had so often quenched his thirst on earth.

A priest of truth; his office to expound
Earth's mysteries to all who willed to hear;
Who in the book of science sought and found,
With love, that knew all reverence, but no fear.

A priest who prayed as well as ministered;
Who grasped the faith he preached and held it fast,
Knowing the light he following never stirred,
Howe'er might drive the clouds thro' which it past.

One rule his life was fashioned to fulfil,
That he who tends Truth's shrine, and does the hest
Of science, with a humble, faithful will,
The God of Truth and Knowledge serveth

And from varieties of force and power,
A larger unity, and larger still,
Broadens to view, till in some breathless hour
All force is known, grasped in a central Will.

Untired in charity, of cheer serene;
Not caring world's wealth or good word to earn;
Childhood's or manhood's ear content to win;
And still as glad to teach as meek to learn.

Such lives are precious: not so much for all
Of wider insight won where they have striven,
As for the still small voice with which they call
Along the beamy way from earth to heaven.

After a short discussion a hearty vote of thanks was given to Mr. Worrall for his highly instructive paper.

The Secretary announced that Messrs. Barron, Harvey and Co., had sent fifty specimens for the Society's museum, whereupon Mr. Learoyd proposed and Mr. Ellinor seconded a vote of thanks to that firm for their kindness, which was unanimously carried.

Mr. Humphrey as Secretary to the school reported that the number of students in the classes is as follows:—Practical Chemistry, 12; Materia Medica, 19; Theoretical Chemistry, 20; Botany, 20; Pharmacy, 7; Total entries 78, being 30 above last session.

Mr. Robert Watts was elected a member; and the following seventeen gentlemen associates of the Society:—Messrs P. Akroyd, W. Barritt, A. Barritt, H. A. Belbin, S. V. Booth, G. E. Dixon, E. E. Dufty, E. Exell, E. Harrop, J. Inman, W. Mannifield, J. Mason, M. F. Peat, F. Rose, W. Symons, R. Shaw, E. F. W. Thorpe.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The second meeting of the eleventh session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on Wednesday, November 14, at 9.15 p.m., Mr. George Coull, President, in the chair.

The minutes of last meeting having been read and approved, the Secretary read the report of the Committee on the Association Prizes Competition. Three candidates had entered and presented themselves for examination. The Committee expressed their regret that so few had entered and also that the papers handed in showed a lower standard of excellence than that of previous competitions. Two of the papers were so deficient in the subject of chemistry that the second and third prizes could not be awarded. The first prize (value £2 2*s.*) was awarded to Mr. George Baxter, 69, South Clerk Street, with 72 per cent. of marks. The report concluded by expressing an earnest hope that apprentices would show a higher appreciation of the opportunities afforded by these competitions, so that the Association might be encouraged to continue a scheme which had been productive of so much good in the past. The prize, and also a copy of Attfield's 'Chemistry,' from Mr. Peter MacEwan, London, was then presented to the successful candidate by the President.

The remainder of the evening was devoted to the reading and discussion of notes arranged by Mr. George Lunan. The first was a—

Note on the Solubility of Strontium Nitrate in Alcohol.

BY J. RUTHERFORD HILL.

The results recorded in this note were obtained during an inquiry suggested by a query in the *Chemist and Druggist* of October 27, as to the solubility of strontium nitrate in alcohol. The reply stated that there was no published information on the point. This corresponds with my own experience, and I made the following experiments with a view to supply the desideratum.

The ordinary commercial pure strontium nitrate I found to be the hydrated salt having the formula $Sr(NO_3)_2+4H_2O$, and from this I prepared the anhydrous salt.

The solubility in absolute alcohol was first determined. A quantity of the anhydrous salt was macerated in the alcohol for twelve hours, with frequent agitation, at a temperature of 60° F. 12·57 grams of the clear solution were poured off into a tarred beaker and evaporated to dryness, leaving a residue which, after being heated to 120° C. and cooled, was found to weigh ·003 gram. From this it is calculated that 1 part of anhydrous strontium nitrate requires for solution 4189 parts by weight of absolute alcohol. Miller and Gmelin state that strontium nitrate is insoluble in absolute alcohol. Roscoe and Schorlemmer state that it is sparingly soluble. The latter statement is correct.

Adopting the same process with ordinary rectified spirit the following results were obtained:—11·7 grams of a saturated solution (at 60° F.) left on evaporation ·058 gram residue = 1 to 200·73. In a second experiment 10 grams of solution left ·05 gram residue = 1 to 199. Taking the mean of these two results we find that 1 part of anhydrous strontium nitrate requires for solution 199·87 parts by weight of rectified spirit at 60° F. That is in round numbers, 1 part of strontium nitrate requires for solution 4190 parts by weight of absolute alcohol or 200 parts by weight of rectified spirit at 60° F.

The next communication was a—

Note on Unguentum Hydrargyri Nitratis.

BY J. RUTHERFORD HILL.

The following incident was recently brought under my notice by a provincial chemist. He had been accustomed to dispense the following prescription:—

℞ Ung. hyd. nit.	℥iij.
Vaselin	℥vj.
Aq. Calcis	℥iv.

Ft. Ung.

The product had always been of a nice lemon-yellow colour. On one occasion a fresh sample of the mercurial ointment was used, and the result was a bluish-black ointment. Why was this? It was suggested that the cause was the presence of mercurous salt in the ointment. To test this ½ ounce of the strong ointment was melted, 3 or 4 minims of nitric acid added, and the whole stirred briskly for a few minutes. On dispensing the prescription with the ointment so treated, the usual lemon-yellow preparation was obtained. Evidently therefore the bluish-black colour was produced by a reaction between mercurous salt and the lime water, and consequent precipitation of black mercurous oxide. It seems probable either that the quantity of nitric acid used in preparing the ointment originally was less than the official formula requires, or possibly the olive oil used may have contained cotton or some other seed oil, which Maben has shown to have a powerful reducing effect on mercurial salts. It is well known that nitrate of mercury ointment has a reputation for being tricky; one sample keeping well and another mysteriously going wrong. This incident may be taken as another proof of the necessity for careful attention to the details of the official process, and to the purity of the ingredients, especially the olive oil, which is not infrequently adulterated with cotton-seed oil.

The next communication was a—

Note on Blaud's Pill Mass in Capsules and Pills.

BY G. F. MERSON.

Mr. Merson had examined nine commercial samples of Blaud's pills and three of Blaud's pill mass in capsules with the following results:—

Pills.

A contained	. . . .	15·6 per cent.	$FeCO_3$
B	„	19·6 „	„
C	„	14·2 „	„
D	„	18·9 „	„
E	„	23·1 „	„
F	„	10·3 „	„
G	„	16·7 „	„
H	„	21·1 „	„
I	„	20·7 „	„

Capsules.

A contained	. . . .	20·5 per cent.	$FeCO_3$
B	„	17·8 „	„
C	„	20·84 „	„

The pills show an average percentage of ferrous carbonate of 17·5. In a similar inquiry two years ago Mr. Duncan found an average of 15·6. Apparently, there-

fore, the attention recently drawn to the subject has been, so far, productive of the desired result. The capsules are a recent introduction, and compare favourably with the pills. The samples of the latter were re-examined after an interval of four weeks, when the results were found to be practically the same, thus showing the keeping properties of a composition such as Blaud's pill mass, when well made and enclosed in an air-tight coating.

The last communication consisted of—

Notes on the B.P.C. Formulary, 1888.

BY GEORGE LUNAN.

Acetum Ipecacuanhæ.—It is unnecessary to reduce the drug to No. 20 powder. If the woody meditullium is only partially bruised it hastens the percolation when evenly distributed throughout the powder and the product is in no way reduced in strength. The preparation is, of course, not a new one. It contains as much emetine as vinum ipecacuanhæ, B.P., and in this process the drug is not subjected to any drying process such as must, to a small extent, injure the active principle.

Elixir Phosphori.—This formula is taken from a well-known 'Extra Pharmacopœia.' The direction "shake well" requires emphasizing. It is very little prescribed in Scotland, but I know it to be extensively used in England. I think it would be an improvement to have it only one half the strength, viz. : $\frac{1}{100}$th of a grain in each fluid drachm.

Elixir Saccharini.—My experience of this preparation is that this solution keeps perfectly, and is admirably adapted and very convenient for dispensing.

Emulsio Olei Morrhuæ, No. 2.—Evidently the Committee have been impressed by the unfavourable criticism with which their previous effort was received. By the sample on the table you will at once recognize a much better emulsion and I find the process presents no difficulties.

The omission of oil of cassia is a great improvement, but the amount of oil of bitter almonds might well be halved. The preparation keeps very well considering that yolk of egg is used in emulsifying, but no doubt the presence of saccharin has much to do with this. It is very questionable whether the Committee should trouble themselves to publish No. 3, as, with the improved quality of cod liver oil, most people prefer it plain to the flavoured messes which the last ten years have called out.

Liquor Ferri Hypophosphitis Fort.—Since the publication of last year's Formulary the best method for preparing ferrous hypophosphite has been pretty extensively discussed.

Decomposition of the calcic salt by ferrous sulphate was adopted, but the slow deposition of the calcic sulphate made the result very unsatisfactory. It was suggested that it could be advantageously made by dissolving freshly precipitated ferrous carbonate in hypophosphorous acid, and that it could be made in concentrated form in this way.

Mr. Everson mentioned that he had made it very satisfactorily for years by the decomposition of the barium salt. This is the process now adopted, and a small quantity of hypophosphorous acid is at the same time prepared by using excess of barium salt and decomposing it with sulphuric acid. The quantity of free acid is not, however, apparently sufficient to preserve the liquor. There is no doubt about the superiority of this over the old method. Its drawbacks are: commercial barium hypophosphite is not of uniform composition ; it is so poisonous that it must only be used by skilful hands; the barium sulphate is so finely divided that the process of syphoning off the liquid causes considerable loss of material.

It contains 5 grains per fluid drachm of the hydrated salt $Fe2PH_2O_2 + 6H_2O$, which is equal to $3\frac{1}{8}$ grains of anhydrous ferrous hypophosphite. It is doubtful if it would not have been better to have calculated as anhydrous hypophosphite, as the $6H_2O$ salt is more hypothetical than practical.

Liq. Hypophosphitum Comp.—The abbreviated name, and, as far as trouble in making the solution is concerned, the revised process are both improvements. It remains to be seen whether it will keep any better.

Syrupus Codeinæ.—This syrup, which is usually prepared with the citrate or phosphate, is directed to be made by dissolving the alkaloid in dilute spirit and adding to simple syrup. This is an improvement, and as yet there is no appearance of the fungoid growth so often seen before. It will also probably be more compatible than when prepared with the citrate or phosphate.

Syr. Ferri Bromidi.—There is little gained by making this direct from the metal, as the syrup becomes coloured in time, unless 0·2 per cent. of hypophosphorous acid is added. This would reduce any bromate or oxybromide that might be present in the commercial salt, and the necessity for this good, but impracticable and disagreeable process is not established.

Syr. Ferri Hypophosphitis.—On mixing the liquor with the syrup to form the above the mixture becomes opalescent, from the formation of a finely amorphous precipitate. The addition of 1 per cent. of hypophosphorous acid prevents this, the cause of which requires further investigation.

Syrupus Hypophosphitum Compositus.—This revised formula is a decided improvement. The amount of lime, manganese and potassium hypophosphites is reduced to one-half, and the formula for the syrup of the three latter salts is incorporated with the general process. This time there is no difficulty in getting the salts into solution. The quantity of hypophosphorous acid is also doubled. The strength of the syrup is as follows:—strychnine, $\frac{1}{160}$ grain, quinine, $\frac{1}{8}$ grain, ferrous hypophosphite, $\frac{3}{4}$ grain, manganese hypophosphite, $\frac{1}{4}$ grain, potassium hypophosphite, $\frac{1}{4}$ grain, and calcium hypophosphite $\frac{1}{2}$ grain in each fluid drachm. This is considerably less than the proportion claimed by the various commercial hypophosphite syrups. I note that we are still unprovided with a formula for preparing hypophosphorous acid. Considering the number of times it is used in these formulæ it is time we had something official on the subject. Last time the Committee demanded an acid with a specific gravity of 1·136, now they are more concerned that it should contain 30 per cent. of real acid.

Syrup. Pruni Virg.—This is also transferred from the 'Extra Pharmacopœia.' The glycerine is presumably intended to act as a preservative and prevent further fermentation. The syrup possesses the full aroma of the drug, and preserves unimpaired the full amount of hydrocyanic acid. It appears to darken by keeping.

Tinctura Phosphori.—In making this great care should be taken to get a piece of bright phosphorus, and the quantity required should be cut from the centre of the roll and well dried between blotting paper before weighing. It is not an operation which could be safely left to a junior apprentice, as the manipulation requires care to avoid burning the fingers. From the samples on the table you will see that the elixir made with the same sample of tincture is in good condition, while there is a considerable deposit in the tincture, presumably of phosphorous oxide, P_2O_3. The tincture should therefore be made directly into elixir, as it is not intended, and would be unsuitable for administration by itself. The Committee would have done much better had they incorporated both formulæ in one.

I am obliged to J. Robertson and Co, 35, George Street, for the samples on the table.

The reading of the notes was followed by a very interesting discussion taken part in by Messrs. Carsewell, Coull, Dougall, Henry, Hill, Lunan, McEwan, Macpherson, Merson and Wilson, and on the motion of the Chairman a cordial vote of thanks was awarded to the authors of papers.

The Chairman having intimated that next meeting would take place on Wednesday, the 28th inst., when papers on "New Remedies," by A. R. Bennet, and "Pharmacy Notes," by John Findlay, will be read, the meeting was closed.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The second monthly meeting of the present session of the Midland Counties Chemists' Association was held on Tuesday evening at the Mason College. Mr. G. E. Perry (President of the Association) in the chair.

The proceedings commenced by the reading of the following—

Laboratory Notes.

BY R. A. CRIPPS.

A Simple Test for some Impurities of Balsam of Tolu.—Balsam of tolu is one of those products which, on account of its price and resinous nature, is very liable to adulteration. Such obvious adulterations as sand, earth, chalk, etc., can readily be detected, but this is not the direction in which most adulterated samples are sophisticated, other resins being naturally selected for the purpose. I do not claim any originality for the reaction which constitutes the test I now propose, but I have seen no communication recommending its use in testing balsam of tolu, which is sufficient reason for bringing it before your notice this evening. About 30 grams of the sample are digested in bisulphide of carbon for about fifteen minutes, keeping it gently warm by occasional immersion in hot water. The clear liquid is poured off, evaporated to dryness, and when cold, sulphuric acid added to dissolve the resinous extract. A bright red-rose coloration is produced, which in the case of genuine tolu remains of a distinctly rose hue for some considerable time. If, however, the sample be adulterated with either storax or ordinary resin, the rose colour rapidly becomes more brown in tint. The best way to apply the test is by performing the operation upon a genuine sample by the side of the suspected one. In this way a distinct difference in tint can be observed if only 1 per cent. of the adulterant be present; with 4 per cent. of resin, or rather more of storax, the difference in tint can be readily distinguished without the blank experiment. If to the sulphuric acid solution a fluid ounce of water be rapidly added, the colour of the resulting liquid is much duller and paler when ordinary resin is present than with the pure balsam.

Note on the amount of Resin in Jalap.—Some time ago Dr. Squibb (*Ephemeris*, June, 1888) published a paper in which he has shown that previous to about the year 1870 commercial jalap could readily be obtained yielding 13 or 14 per cent. of resin, but that since that date he had rarely found a sample containing as much as 12 per cent., as required by the United States Pharmacopœia. As I have examined a considerable number of samples of jalap during the last two years I thought it might be interesting to record the results, especially as the British Pharmacopœia now requires that it shall contain not less than 10 per cent. of resin. The process which I adopt differs in detail from that of Dr. Squibb, which appears to me to be unnecessarily tedious, the same principles, however, being applied. I proceed as follows:—2 grains of the sample are digested in a small flask or bottle (closely corked) with 50 c.c. of rectified spirit, the whole being kept gently warm. After twenty-four hours the liquid is allowed to cool and filtered. Twenty-five c.c. of the filtrate are then evaporated to dryness on a water-bath, and about 20 c.c. of distilled water added to the contents of the dish and gently warmed. When the liquid reaches a certain temperature, about 50° C., the resinous extract becomes so soft that it can be easily kneaded by means of a glass rod, so that the water can thoroughly exert its solvent action on the saccharine matter contained in it. When this stage is reached the dish is removed from the water-bath, the extract well kneaded, and the whole allowed to cool. The clear, or nearly clear, liquid is poured through a filter, and the washing operation repeated twice more, when the resin will remain practically pure. The filter is washed with rectified spirit and the washings added to the contents of the dish. This is then evaporated and dried at 200° C. and weighed. It will be seen from the annexed table of results that fourteen out of thirty-four samples contained the full percentage of resin as required by the British Pharmacopœia and seven contained 7 per cent.

	Per cent.		Per cent.
No. 1 . . .	11·9	No. 18 . . .	9·4
„ 2 . . .	7·0	„ 19 . . .	13·6
„ 3 . . .	6·9	„ 20 . . .	13·7
„ 4 . . .	7·3	„ 21 . . .	11·7
„ 5 . . .	11·05	„ 22 . . .	9·1
„ 6 . . .	8·15	„ 23 . . .	6·3
„ 7 . . .	8·95	„ 24 . . .	7·6
„ 8 . . .	8·9	„ 25 . . .	15·6
„ 9 . . .	9·45	„ 26 . . .	12·0
„ 10 . . .	11·9	„ 27 . . .	10·1
„ 11 . . .	7·2	„ 28 . . .	5·8
„ 12 . . .	8·3	„ 29 . . .	15·2
„ 13 . . .	8·7	„ 30 . . .	12·9
„ 14 . . .	9·15	„ 31 . . .	6·5
„ 15 . . .	10·8	„ 32 . . .	9·9
„ 16 . . .	13·2	„ 33 . . .	7·3
„ 17 . . .	10·6	„ 34 . . .	8·9

It would appear, therefore, that the quality of jalap in the English market is rather superior to the New York supply.

In the course of the discussion which followed Mr. Alcock expressed the opinion that Mr. Cripps's mode of procedure in arriving at his conclusions was quite new, and concurred with the reader of the notes that such as he had got of the American samples of jalap contained a much less percentage of resin than those in the English market.

Several members present criticized Mr. Cripps's remarks, and Mr. Cripps, in reply, said that the amount of actual spirituous extract from the resin was in no sense a criterion of its value.

On the motion of the President, seconded by Mr. Robinson, a vote of thanks was accorded to Mr. Cripps for his paper.

A communication was then read on—

Chloroform and Allied Substances.

BY A. E. ROBINSON.

The intention of the paper apparently was to show the analogy existing between chloroform and iodoform from a constitutional sense.

The equation usually adopted to express the formation of chloroform, $CHCl_3$, comprehends the action of hypochlorites upon alcohol; whereas the equation for production of iodoform CHI_3 is usually represented by the direct action of iodine upon alcohol in presence of caustic or carbonated alkali. Hitherto the existence of a compound corresponding to the hypochlorites, viz., a hypoiodite of an alkali has not been proven, but by a

series of electro-chemical experiments and syntheses, the author had proved the existence of such a body, the formula for which might be expressed as KOI. He had further proved that upon the presence and formation of this body depended entirely the formation of iodoform. That free nascent iodine and the absence of caustic alkali or alkaline earth had no action upon alcohol was proved by passing a current of electricity through an alcoholic solution of zinc iodide, zinc being deposited, and iodine liberated, but no iodoform being formed. The author promises a further paper on this and allied subjects dealing more fully with the matter.

A vote of thanks was accorded to Mr. Robinson on the motion of the President, seconded by Mr. T. W. Chapman. A discussion of the paper followed, in which the President and Messrs. Cripps, Southall, Campbell, Lloyd and Alcock took part.

Mr. Robinson replied to the points raised.

Parliamentary and Law Proceedings.

Prosecution under the Seventeenth Section of the Pharmacy Act.

At the Greenwich Police Court on Friday, Nov. 16, Richard Harrison, described as a chemist and druggist,* of 2, Kent House Lane, Lower Sydenham, appeared to an adjourned summons, at the instance of the police, for selling a certain poison—namely, laudanum, to a girl named Mary Short, in a vessel not distinctly labelled with the name and address of the seller, on October 19.

It was stated that, in consequence of complaints received at the Penge police-station, arrangements were made for the purchase of some poison, and the girl Short was sent into the shop to buy some laudanum, which was served to her in a bottle labelled "Poison," but not bearing name and address.

Defendant said he had only been in the place for a few weeks, and had not had labels printed. In this case the girl told him a falsehood, saying that she came from a Mrs. Smith, whom he knew. He denied having sold poison in this way before.

Mr. Marsham told him that if he was caught the first time it was very unfortunate for him. The penalty was £5 for the first offence, and £10 for the second. He inflicted a fine of 20*s.* and costs.—*Times.*

Obituary.

Notice has been received of the death of the following:—

On the 16th of October Mr. George Beck, Chemist and Druggist, Dale End, Birmingham. Aged 51 years.

On the 7th of November Mr. John Jeremiah Smith, Chemist and Druggist, St. James Street, Burnley. Aged 69 years.

On the 11th of November, Mr. Alfred Binge, Chemist and Druggist, Seven Sisters Road, London, N. Aged 50 years.

BOOKS RECEIVED.

Pharmakologische Untersuchungen über Digitalis ambigua. By Dr. Heinrich Paschkis. Vienna: A. Hölder. From the Author.

Elocution, Voice, and Gesture. Illustrated by Pieces, annotated with Inflections, Emphasis, Pauses, and Gesture. By Rupert Garry. London: Bemrose and Sons. 1888. From the Publishers.

* There is no corresponding entry in the Register of Chemists and Druggists.—Ed. Ph. J.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Chemistry of Cacao Butter.

Sir,—In the issue of this Journal of November 3 last, attention has been directed at some length to the results of an investigation of the chemistry of cacao butter conducted by Herr Paul Graf.

While some of these results are confirmative of the information which I first made public more than ten years ago, there are others which seem to call for some notice at my hands, lest it should be considered that I acquiesce in the main conclusions arrived at by Herr Graf.

The sample of cacao butter which I examined in 1877 melted at about 30° C., which observation practically accords with the more recent experience of Graf and that of other observers generally, although, of course, the melting point is not to be regarded as a matter of any considerable importance.

When the cacao butter was digested in boiling alcohol of 85 per cent. strength, only traces of matter passed into solution, and, similarly, a hot solution of dilute ammonia failed to exercise any solvent action.

From these observations two conclusions may properly be drawn, namely, that the sample of cacao butter in question was free both from cholesterin and free fatty acids, for cholesterin is readily soluble in hot alcohol and crystallises therefrom on cooling, while, of course, hot ammonia would saponify any fatty acids existing in the free state.

Working by other methods, which are not more satisfactory in character, Graf arrived at the conclusion that the specimen of cacao butter which he examined contained a small amount of free fatty acids, but, apparently, it was too small to be stated by way of percentage, and, therefore, may, I think, be disregarded for all practical purposes. He also found present a small quantity of a substance which he regarded as identical with or analogous to cholesterin. But here again the quantity must have been too small to be determined, for it appears he made no analysis of it, and relied entirely upon the resemblance of its crystals to those of genuine cholesterin and upon a colour reaction which it gave when treated with chloroform and sulphuric acid; this reaction, however, is not characteristic merely of cholesterin, but is common to a large variety of chemical substances.*

In any case, if cacao butter contains cholesterin, then I contend that it is not present uncombined, for else it would of necessity be dissolved by hot alcohol, but must be present in the only other known chemical form, namely, in combination with a fatty acid.

Stearo-cholesterin is illustrative of a class of such substances, although from the evidence before me I am reluctant to come to the conclusion that the presence of any such compound in cacao butter has been established.

Further, Graf is stated to have ascertained the presence of volatile fatty acids in cacao butter, but no statement is given of the quantity observed to be present, and in the course of my investigation, although special attention was devoted to this point, I came to the conclusion that the cacao butter upon which I worked was entirely free from volatile or soluble fatty acids.

With respect to oleic acid as a constituent of cacao butter, Graf's analysis of the oleate of barium confirms the analysis which I formerly made; but I carried the investigation somewhat further than Graf, and approximately determined the amount of oleic acid present in a given quantity of the cacao butter, and ascertained it to amount to about 20 per cent. of the total fatty acids.

The separation of the solid fatty acids was effected to some extent in Graf's investigation by the method of fractional crystallization, and he, like myself, found that there was a distinct difference in the melting points of the several fractions. Instead, however, of carrying the fractionations as far as I did, he prefered to fractionally pre-

* See paper by Kingzett and Hake, *Pharm. Journ.*, [3] vol. vii., p. 914.

cipitate the various alcoholic solutions of the deposits with magnesium and barium acetate, according to the method of Heintz, and from the analyses of these fractional precipitates he inferred the presence of the following solid fatty acids: stearic, palmitic, arachidic, and lauric acids. No acid of higher molecular weight than arachidic acid could be detected.

The facts remain, however, that in my investigation I obtained, by persisting in a lengthened series of fractionations, a series of crystallized deposits which were repeatedly analysed, and one of which, when subjected to analysis in duplicate, furnished the following calculated percentages:

(A) C.	82·62	(B) 82·21
H.	13·92	14·16
O.	3·46	3·63.

Before proceeding to discuss further the possible nature of this substance, I may state that one of the greatest difficulties which is experienced in conducting ultimate analyses of substances containing high percentages of carbon is to effect perfect combustion, and in my analyses (being well aware of this difficulty from a large experience) I took care to employ chromate of lead in making the combustion and the supplemental aid of perchlorate of potassium. Of course, I do not for one moment suggest that Graf failed to thoroughly burn the fatty acids prepared by him, but, at any rate, I insist upon the accuracy of my own figures.

Now, when we come to deal with these figures it may be urged in the light of Graf's later investigation that possibly my so-called theobromic acid contained a proportion of cholesterin which would consequently increase the percentage of carbon, and this supposition derives some sort of support from the fact that in my paper I stated that at high temperatures this acid distils apparently unchanged, and is sometimes obtained in beautiful pearly plates.

There are difficulties, however, in the way of accepting any such suggestion, for in the first place it will be remembered I established the absence of free cholesterin by the fact that cacao butter yields nothing to solution when digested with hot alcohol. The only other explanation, therefore, of the presence of cholesterin in the fatty acids which I analysed would seem to be that cacao butter contains stearo-cholesterin (or some such substance), and when saponified it is split up, yielding cholesterin in the free state, so that by means of the fractionations which I made I managed to concentrate most of the cholesterin into the fraction, which, upon analysis, yielded the figures previously given. Of course, if I had any of this so-called theobromic acid at the present time, it would be easy to test it for cholesterin, but, unfortunately, at the request of Mr. A. H. Allen, of Sheffield, I sent him the whole of my specimens, including the analysed portion above referred to, on March 22, 1883, and in reply to the inquiry which I have just made, I am informed that the specimens cannot be found at the present time.

In conclusion, it may be desirable to show side by side the percentic compositions of pure cholesterin and theobromic acid.

	Cholesterin.	Theobromic Acid (theory).
(A) C.	83·187	(B) 82·75
H.	11·82	13·79
O.	4·30	3·46.

It will be seen that these figures approximate to a large extent, but at the same time, while further investigation may possibly satisfactorily establish the contamination of my product with cholesterin, I must decline to admit, so far, that has been proved, and can only couple with it the expression of hope that some other young chemist or pharmacist will take up the subject, and repeat step by step the whole of my work, with the object of satisfactorily establishing the truth one way or the other. Until this is done I shall still believe in the existence of theobromic acid as descriptive of a fatty acid present in cacao butter and having a heavier molecular weight than any other known member of the series.

C. T. Kingzett, F.I.C., F.C.S.

[*** Mr. Kingzett's data seem to point to the probability that the substance described by him as theobromic acid was for the most part cholesterin or some analogous compound.—Ed. P. J.]

Tartar Emetic.

Sir,—I would be unwilling to add a discordant note to the harmonious discussion which followed the reading of the paper on Tartar Emetic, at the recent evening meeting; were it not that at least one statement was made, which ought not to be allowed to pass, especially as it proceeds from a Professor. The dictum that "molecules certainly are divisible," is either a truism or nonsense. As applied to the case under discussion, it belongs to the latter category. To suppose that we may have half H_2O is obviously absurd. It may sometimes be convenient to express water of hydration in fractions, but the method is in itself inaccurate.

As regards the specific rotatory power of solutions of tartar emetic, Professor Dunstan and Miss Boole give results with a 4 per cent. solution of the salt, yet in the calculation no account is taken of the specific gravity. Such a method would not give the correct value for $[\alpha]_D$. It is, however, probably meant that a solution containing 4 grams in 100 c.c. was employed. If that is the case, it ought to have been so stated.

Edinburgh. D. B. Dott.

"Dilem Leaves."

Sir,—Referring to your abstract of Messrs. Schimmel's report on Essential Oils (*Pharm. Journ.*, Oct. 27 last), mention is made of "dilem" leaves from Java, yielding a perfume resembling patchouli, but finer; it would be interesting to compare a sample of these leaves with the analysis described by Dr. Heinrich Paschkis in this Journal, April 2, 1881.

The name of the patchouli plant at Singapore is Tilâm, the i being soft, as in Italian. In the Malay dialect the sound of t is preferred to the harder sound d, and as Germans, speaking in a language other than their own, frequently transpose these letters, it is likely that in transcribing from the Javanese the word is mis-spelt.

The leaves are probably from *Pogostemon Heyneanum* (Benth.), an uncultivated variety of *Pogostemon Patchouli*, found in Java. If the perfume is preferred to that of the leaves usually imported here the cultivators at Singapore might profitably renew their plantations with this particular variety.

The methods of "curing" the leaves of pogostemon and plectranthus are various, and the sample mentioned in Messrs. Schimmel's report may owe its qualities of being "fresher, finer and less musty," to a particular process of curing. The fineness of the aroma of such leaves appears to be quite as dependent on the process of curing (which is a sweating and partial fermentation) as does the aroma of tobacco leaves or vanilla pods.

Brighton. J. M. Sauer.

Erratum.—On p. 404, col. ii., line 21 from bottom, for "Dr. Brand" *read* "Dr. Braid."

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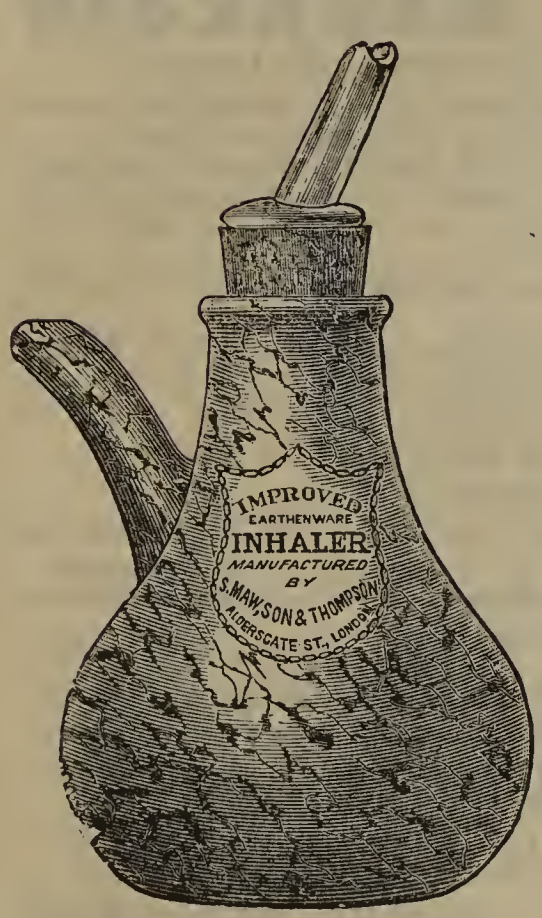

Fig. 8.
MAW'S IMPROVED.

Fig. 6.
MAW'S DOUBLE-VALVED.

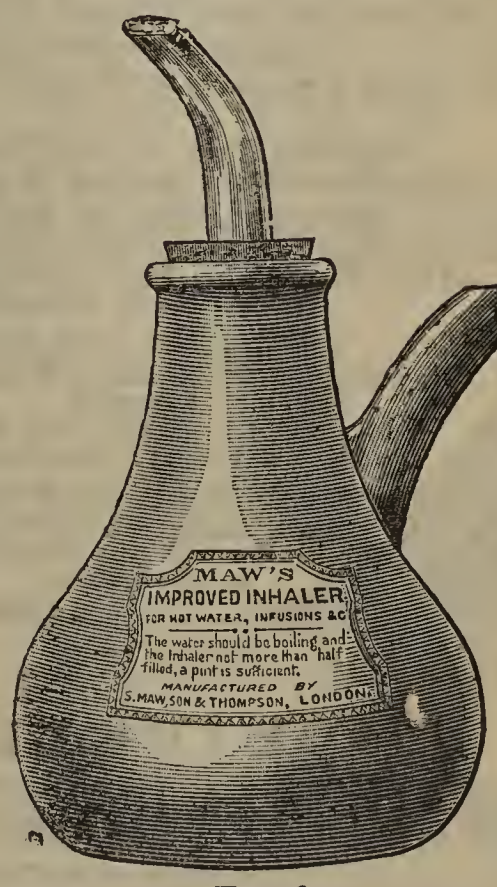

Fig. 8a.
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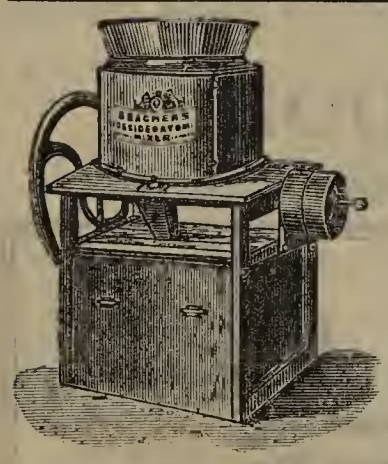

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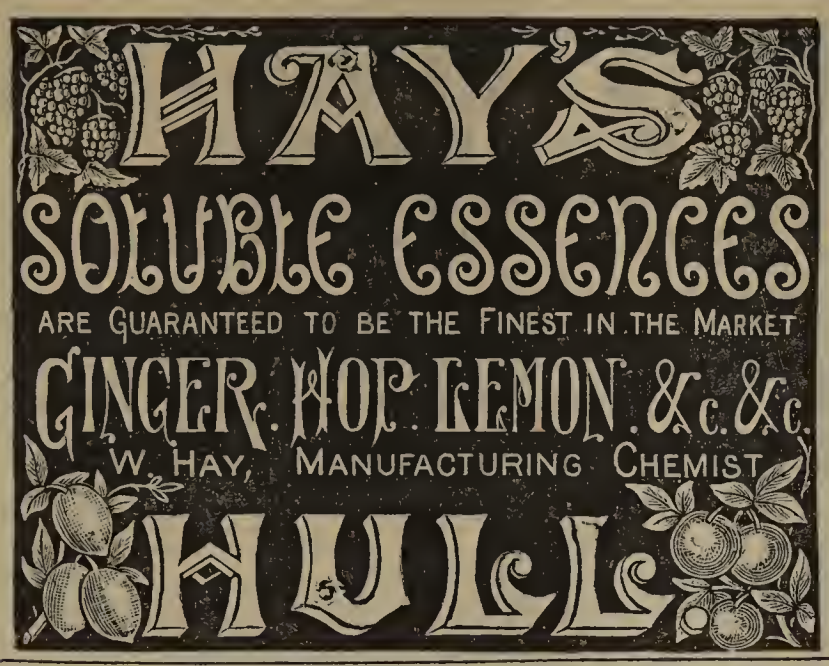

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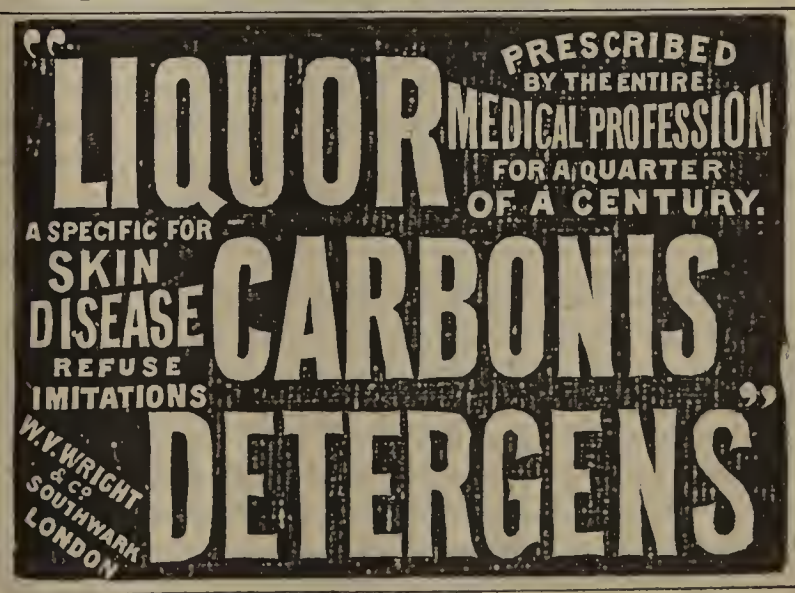

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WANTED immediately, quotation for 2000 small ALMANACS, to contain about 24 pp. special matter and 24 pages to be for diary. Chromo-lithographed cover and neat get up. Samples and price to be sent to, and further particulars may be had from, L., 529, Battersea Park Road.

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32, LUDGATE HILL, LONDON.

MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

VENDORS have the advantage of obtaining an opinion on Value, derived from extensive experience, and are in most cases enabled to avoid an infinity of trouble by making a selection from a list of applicants for purchase, with the view of submitting confidential particulars to those alone who are most likely to possess business qualifications and adequate means for investment.

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1. LONDON (City).—Lock-up shop. Well suited for a Branch business. Retail and Dispensing, with Prescribing. Returns nearly £700 yearly. Well-fitted shop and good stock. Price £650.
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4. GLOUCESTERSHIRE.—First-class Family BUSINESS, Retail and Dispensing. Returns at present £950. Net profits £350 to £400. Double-fronted, handsomely fitted shop, and good stock. Good house, &c. Price about £950.
5. WORCESTERSHIRE.—Dispensing and RETAIL, situate in the centre of a favourite locality. Handsomely fitted shop and good stock. Returns £2500. New lease to be granted. Price £1550.
6. SOUTH COAST.—First-class Retail and Dispensing BUSINESS. Returns about £1200 yearly. Net profits over £400. Large and convenient premises. Full particulars on receipt of London reference. About £1100 required.
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Personal applicants receive Messrs. O. & Co.'s direct attention and advice, where required, free.

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Terms for valuation on application.

Appointments by post or wire have immediate attention.

ORRIDGE & CO.

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"Stealing the Handcuffs."

"With this appropriate remark a correspondent [not B., W. & Co.] sends us a reprint from THE CHEMIST AND DRUGGIST of a clever advertisement entitled 'Pirates,' inserted some time since by Messrs. Burroughs, Wellcome & Co. The advertisement commenced—'They [the pirates] are getting rather numerous of late. They make bungling work of it. They copy what they think will do them most good, and not one of them has had the manliness to as much as say "by your leave, sir." They copy our advertisements, and in divers ways seek to deceive the public and steal our thunder.' At the foot of the circular on which this is reprinted is found the name '* * *, manufacturing and export Chemist, * * *.'"—*Chemist and Druggist*, August 25, 1888.

A GENTLE HINT.

Pirates.

They are getting rather numerous of late. They make bungling work of it. They copy what they think will do them most good, and not one of them has had the manliness to as much as say—"By your leave, sir." They copy our advertisements to make people believe that theirs are ours till they get into them; they have used our trade names which we have made popular and valuable by expenditure and work; they denounce the improvements we introduce, until, in spite of their underhanded manœuvres, we secure the just appreciation of the profession, and then they make imitations in appearance, but not in quality; they pirate our trade names, and in divers ways seek to deceive the profession and steal our thunder.

To us it appears truly humorous that firms whose antiquity is their prime boast, and whose traditions harp upon the integrity of ancestral founders, should play such catchpenny antics. Having won by genuine merit and originality the confidence of the profession and trade, we can, so far as we ourselves are concerned, regard these puny pirates very much like the story of the bad marksman shooting at the frogs—it was sport to the one and didn't hurt the others. Still they gave us a theme to descant upon. It is our duty to protect our friends.

When the lame man made a bargain with the blind man for the latter to carry him, they were neither of them in business worth mentioning, and the bargain was mutually advantageous; but for one who might both walk and see to saddle himself on to another is not delicate, to say the least. We feel that we can see and walk, and when those who might do the same try to ride on our industry it seems our bounden duty to point out to them how unbecoming their conduct really is.

We have become more or less used to imitators, and when the thing is done right handsomely it almost seems like a compliment: but to be a compliment it should certainly be free from the semblance of fraud. "Me too" has ever been the motto of trade pirates, and of those who have lost their grip and of those who never deserved.

For the edification and comfort of our imitating neighbours we offer an allegory—it is a very ripe chestnut, but a sound one; and here it is. Once upon a time—not so very long ago,—as the story goes, a company of soldiers were garrisoned in mountain wilds where there were Indians on the warpath. One day a tribe of Red Men were spied in a valley, and the soldiers were forthwith ordered out in great haste. They strapped a cannon on to the back of a mule, and hastened away to give battle. When they reached the crest of a cliff they saw the war-dancers in the valley below.

They had no time to dismount the cannon, so turned the mule about as a gun-carriage and fired. The howitzer "kicked" so tremendously that it knocked the animal off his legs, and cannon and mule rolled precipitately down the hill into the midst of the Indians, scaring them nearly out of their wits, and frightening them into a hasty retreat—all but one, who was so paralysed with fear that he allowed himself to be captured and taken to the camp. When interrogated as to why he allowed himself to be taken, he exclaimed—"Me no 'fraid soldier man, me no 'fraid of cavalry man, but when live jackasses fired me, me think the devil must be near."

Though we do not confess that we are timid, or much unnerved, the Indian's case is in some respects like our own. Legitimate business warfare may be engaged in with satisfaction, and we heartily applaud all new improvements and legitimate enterprises from whatever source they come; but who likes trade "jackasses" precipitated upon them as competitors?

Now, Imitators, we enjoin upon you to discard your schoolboy mimicries. We don't expect much of you.

"* * * No earth-born will
Could ever trace a faultless line;
Our truest steps are human still,
To walk unswerving were divine."

Still, "Be not too bold!" "Assume a virtue if you have it not." When you want a new name for one of your products (or imitations) give it a name that does not deceive. Give it a name that has not been made valuable by others' expenditure and industry. Give it a name that, when you make your sales, you can say to yourselves—"These do not rightfully belong to another." What is it to appropriate a trade name but to take what another has laboured for and that may become in all equity his means of subsistence? Sales thus made are dearly bought. A word more: we would suggest that those whose enfeebled intellects prevent them from creating anything original, and who find it necessary to copy our advertisements, might do so in such a manner that readers will not be led into mistaking and reading their pages for ours.

Those who have, through inadvertence, trespassed upon our rights, and who have made the *amende honorable* when we have called their attention to the trespass, we acquit of all wrong intent, and can but respect their frankness and honesty of purpose. Everyone is liable to tread unwittingly upon the rights of ~~their~~ his fellow-men, but an honest man is ready to admit his fault and relieve his conscience. Wilful trespassers who persist in wronging us, and thereby render themselves liable under the law, we have punished, and shall punish, with the utmost severity. Those who wilfully trespass upon our rights, but cunningly evade the liabilities of the law, we shall expose to the ignominy they so justly deserve.

BURROUGHS, WELLCOME & Co., Snow Hill Buildings, LONDON, E.C.

NOTE.—This is a facsimile of the page advertisement referred to by the CHEMIST AND DRUGGIST. The party who appropriated it copied it word for word, except in substituting his name for ours. Some copy only the Titles of our pages.—B., W. & CO.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 962.] SATURDAY, DECEMBER 1, 1888. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

SPECIAL NOTICE.

Postponement of Evening Meeting.

The next Evening Meeting will be held

On THURSDAY, DECEMBER 13th,

instead of **Wednesday, December 12th,** as previously advertised.

The Chair will be taken at Eight *precisely.*

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society, of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of THREE ANNUITANTS on the Benevolent Fund of this Society will take place on Thursday, the 6th day of December next, at 12 o'clock precisely.

RICHARD BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 3rd, 1888.

For List of Approved Candidates, see Journal, November 24, page ii.

There are at present *forty-nine* annuitants, receiving £1670 per annum, and casual relief is also granted, amounting in 1887 to nearly £500. The total expenditure in 1887 was £2375.

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£30 per annum to pensioners under 65 years of age, and £35 per annum to pensioners 65 years of age, and upwards.

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One Guinea .. .. TEN Votes.
And to increase in the same proportion.
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Should any Subscriber or Donor, or the widow of any Subscriber or Donor, become a Candidate for an annuity, such number of votes shall be placed to his or her credit, at the first succeeding election, as shall be represented by the whole amount of subscriptions or donations to the Benevolent Fund he or she (or in the case of a widow, her husband) may have contributed.

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LONDON: J. & A. CHURCHILL, 11, New Burlington Street.

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Illustrated Catalogue, 1888.

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STRAND, LONDON.

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2.—That letters addressed to initials or to fictitious names at a Post Office are not delivered by the Post Office Authorities, but are at once sent back by them to the writers.

3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM. JOURN.**" and must be sent only to J. & A. CHURCHILL, 11, New Burlington Street, London, W.

Telegraphic Address, "Churchill, Publishers, London."

N.B.—The Journal is supplied from the publishing office post free to any part of the United Kingdom on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad (excepting India and China), 22*s.*; India and China, *viâ* Brindisi, 24*s.* per annum.

Payment may be made either by **Cash** in a Registered Letter, by **Postal Order**, by **Cheque** crossed London and County Bank, or by **Money Order**, payable at Regent Street, W., to J. & A. CHURCHILL. *Postage Stamps for any amount above Ninepence cannot be received in payment.*

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SCHOOL of PHARMACY of the PHARMACEUTICAL SOCIETY		
SELLERS, J.	Carmine Pur.	
SHIRLEY, A. W.	A. 1. Brand Menthol	15
SILVERLOCK, H.	Almanacks for 1889	2
SLACK & BROWNLOW	Filters	16
SMITH, W. F.	Corn Plaisters	16
SMITH, S., & CO.	S.V.R. Spirits of Wine	4
SOUTH LONDON SCHOOL of PHARMACY (Ld.)		19
SPINNER & CO.	Chemists' Tea Agency	14
SPIRONE CO.	Churchill's Inhalant	9
SPRATT'S PATENT (Ld.)	Dog Biscuits, &c.	8
SQUIRE & SONS	Chemical Food, &c.	
ST. DALMAS, A. DE	Emp. Hœmostaticus	
STERN, G. & G.	Pumiline	9
SYMES & CO.	Ol. Limonis	14
TAYLOR, T. & F. J.	Aërated Waters	16
TO BE LET		
TOMLINSON, R., & SONS	Shop Fittings	
TRADE MARK PROTECTION ASSOCIATION		2
TULLY, J.	Preliminary and Minor	17
VAN HOUTEN	Cocoa	10
VERNON, W. H.	Private Tutor	17
WALKER & DALRYMPLE	Chemists' Tea Agency	14
WANTED TO PURCHASE		
WARNER, W. R., & CO.	Pharmaceutical Preparations	
WERNER & PFLEIDERER	Pill Machines	
WESTMINSTER COLLEGE of Chemistry and Pharmacy		18
WHITE, A., & SONS	Manufacturing Chemists	
WILLOWS, FRANCIS & BUTLER	Wholesale Druggists	
WILLS & WOOTTON	Text Books	
WOODS, W.	Areca Nut Tooth Paste	
WOOLLEY, J., SONS & CO.	Manufacturing Chemists	2
WRIGHT & CO.	Liquor Carbonis Detergens	17
WRIGHT, LAYMAN & UMNEY	Wholesale Druggists	14

TRADE **"SANITAS"** MARK.

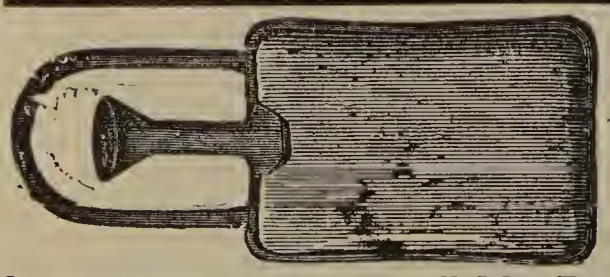
DISINFECTANTS

(FLUIDS, POWDER, SOAPS),

NON-POISONOUS, PLEASANT and BEST. Gold Medals—Calcutta, 1883-84; Paris, 1885; Antwerp, 1886.

THE "SANITAS" COMPANY, Limited, Letchford's Buildings, Bethnal Green, London.

SOLE MANUFACTURERS ALSO OF KINGZETT'S BACTERICIDES.



VULCANIZED INDIA-RUBBER

ENEMAS, URINALS, FOR DAY OR NIGHT. **TUBING, CORKS, TEATS**

HOT WATER BEDS, PILLOWS, CUSHIONS, & BOTTLES.

ELASTIC STOCKINGS AND KNEE-CAPS, &c.

J. L. HANCOCK, 266P, Goswell Rd. Works: Goswell Mews, & 55, 56, 57, 58, 59, 60 & 61, Moreland St., London, E.C.

S.V.R.

PURE GRAIN SPIRIT 56 O.P. ... 18/5

Do. Do. DOUBLE DISTILLED 18/9

Cash with Order. Reductions for larger Quantities than Two Gallons.

SAMPLES FREE.

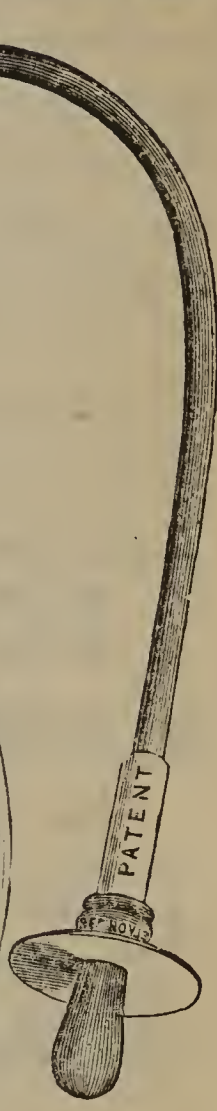
STEPHEN SMITH & CO., BOW, LONDON, E.

S. MAW, SON & THOMPSON'S

FEEDING BOTTLES

Patented in England, December 4, 1879;
Patented in the United States, April 27, 1880.

THE ALEXANDRA.
(Earthenware Cap.



THE EXPORT.
(Glass Screw Stopper.

	White Fittings.			Black Fittings.		
Alexandra, China or Wood Top Corks, per doz.	3/8	—	—	4/3	—	—
Alexandra, 2nd Quality, Wood Top Corks ,,	3/-	—	—	3/6	—	—
Alexandra, Earthenware Caps ... ... ,,	—	8/-	11/-	—	8/6	12/-
Alexandra, Earthenware Screw Stoppers ,,	—	—	11/-	—	—	12/-
Alexandra, Glass Screw Stoppers ... ,,	4/-	8/-	11/-	4/6	8/6	12/-
Export, China or Wood Top Corks ... ,,	3/6	—	—	4/-	—	—
Export, 2nd Quality, Wood Top Corks ,,	2/9	—	—	3/3	—	—
Export, Earthenware Caps ... ... ,,	—	7/3	—	—	8/-	—
Export, Glass Screw Stoppers ... ... ,,	4/-	7/6	—	4/6	8/-	—

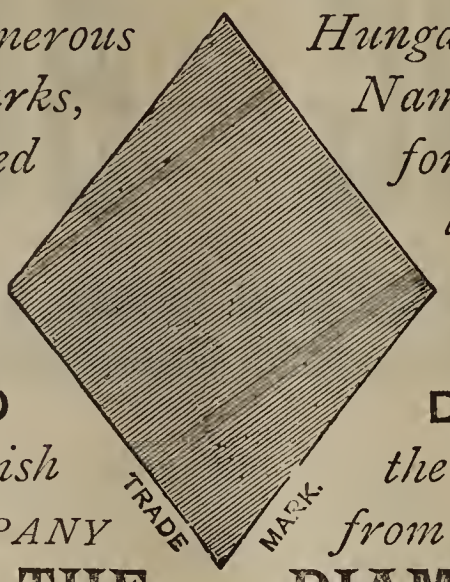
FOR FURTHER PARTICULARS SEE QUARTERLY PRICE CURRENT, PAGES 46 and 47.

SPECIAL QUOTATIONS TO WHOLESALE BUYERS.

S. MAW, SON & THOMPSON, LONDON.

THE BEST NATURAL APERIENT.

The APOLLINARIS COMPANY, LIMITED, London, beg to announce that, as numerous Hungarian Aperient Waters are offered to the public with Marks, Names, and Designations very similar to those which are used for the Hungarian Aperient Water (Hunyadi Janos) so long imported by them, they have now adopted an additional Label of their own, comprising their Registered Trade Mark of selection, which consists of a **RED DIAMOND.** *This Label will henceforth serve to distinguish the HUNGARIAN APERIENT WATER SOLD BY THE COMPANY from all other Aperient Waters.*



DEMAND THE DIAMOND MARK,

and insist upon receiving the HUNGARIAN APERIENT WATER of the APOLLINARIS COMPANY, LIMITED, London.

Of all Druggists and Mineral Water Dealers.

LOFTHOUSE & SALTMER,

Manufacturing Chemists, Wholesale & Export Drug Merchants,

HULL.

Manufacturers of all Pharmaceutical Preparations on the best and most improved principles.

QUOTATIONS ON APPLICATION.

SOLUT. ÆTHERIS NITROSI (Æther. Hyponit.)

1 part to 5 Sp. Vini Rect. 56 o.p. makes Sp. Æth. Nit. 850.

This concentrated preparation is carefully drawn in our own laboratory, is highly recommended, and is daily finding increased favour with the trade for making Sp. Nitre, as required for use, and thus avoiding the risk of a development of free acid, which is more or less prevalent in Sp. Nitre that has been drawn some time.

Price in Winchester Quarts, 3*s.* per lb., net.

Importers of Cod Liver, Castor, and Olive Oils; Otto de Rose, and all Essential Oils; Valentia Saffron; Vanillas; Fruit Essences; Carmine; Aniline Dyes; Bees Wax, &c., &c.

APPLICATIONS FOR SPECIAL QUOTATIONS INVITED.

ROBARE'S AUREOLINE

OR GOLDEN HAIR WASH.

The attention of the Trade is respectfully called to the above Article, now having a large sale, and giving an excellent profit to the retailer.

5/6 size	... ...	36/- per Dozen.
10/6 „	... ...	72/- „

Sole Wholesale Agents, R. HOVENDEN & SONS, LONDON.

LINT

ROBINSON AND SONS,

SPINNERS AND MANUFACTURERS OF

SURGEONS' LINTS & COTTON WOOLS,

WHEAT BRIDGE MILLS, near CHESTERFIELD.

TRADE MARK.

As supplied to the largest Hospitals in the United Kingdom.

Depot—55, Fann Street, Aldersgate Street, London.

A TASTELESS TONIC LAXATIVE GRANULE.

EXACT SIZE.

Bottles containing 25 Pills, 7s. per doz.; Bottles containing 100 Pills, 24s. per doz.

Formula, Aloin, Strychnine, and Belladonna.—McK. & R. Pills.

Aloin	1–5 gr.
Strychnina	1–60 gr.
Ext. Belladonnæ	1–8 gr.

DOSE.—One pill three times a day. Morning, noon, and night. Where a painless peristaltic action is desired by the aged or female patient, one pill may be taken every night or second night at bedtime, as directed by medical attendant.

Since introducing this formula to the profession and adding the granule to our list our sales have been exceedingly large. Over one million were dispensed last year. We have received numerous letters and reports from physicians, speaking in the highest terms of the results of their administration, and thanking us for introducing this granule to their notice.

FROM M.D., M.R.C.P., LONDON, OCTOBER 13th, 1886.

"*These Tonic Laxation Pills can be taken with advantage in those cases (mainly female) where tonics alone set up strangury from their action upon the vesical centres in the spinal cord.*"

Aloin, Strychnine, and Belladonna Pills are prepared by McKESSON & ROBBINS, NEW YORK, expressly for the use of Physicians and Surgeons, and to be dispensed in Prescriptions.

In this form the ingredients are not only perfectly preserved, but do not affect the teeth, or offend the palate, and, further, can be conveniently kept out of sight by those who object to be regarded as invalids. Complete list mailed free on application. PLEASE SPECIFY McK. & R. PILLS.

Originated 1870 by McKESSON & ROBBINS, New York, U.S.A.

London Agency: Messrs. S. MAW, SON & THOMPSON, 7 to 12, Aldersgate St., E.C.

Merchants, Shippers, and the Wholesale Houses in the Trade are also Supplied by—

Messrs. BURROUGHS, WELLCOME & CO., Snow Hill Buildings, London, E.C.;
and Messrs HOCKIN, WILSON & CO., 38, Duke Street, Manchester Square, London, W.

CONCENTRATED

PEPTONISED COCOA AND MILK

AND CONCENTRATED

PEPTONISED MILK (PATENT)

These two preparations are made with pure rich PRE-DIGESTED Country Milk, and, by mere dilution with hot water, afford a delicious restorative beverage, the assimilation of which requires no digestive effort.

SAVORY & MOORE, LONDON.

Tins, 1s. 6d. and 2s. 6d. Obtainable everywhere.

A Suggestion to Chemists wishing to largely increase their Returns.

SELL IDRIS & CO.'S GOODS,

As they are a clear addition to business, many of them not taking the place of goods now sold by Chemists.

IDRIS' FRUIT CORDIALS AND LIQUEURS.

May be used with Hot or Cold Water, and in Winter and Summer. About 30 Varieties. (*See List.*)
IN BOTTLES, ELEGANTLY LABELLED AND CAPSULED.

IDRIS' PALATABLE LIME JUICE,

Lime Juice Cordial and Limetta.

Manufacturing Chemists, Mineral Water Makers, Syphon and Seltzogene Manufacturers, Export and Import Merchants,

ASCHAM ST., KENTISH TOWN, LONDON, N.W.; and 3, WEST ST., FINSBURY CIRCUS, E.C.

Telephone No. 7527.

Prize Medal International Health Exhibition, 1884, for Purity of Herbs and Powders.

POTTER & CLARKE,

75, WESTON STREET, LONDON, S.E. & 58, CANNON STREET, MANCHESTER.

Wholesale and Export Botanic Druggists,

Importers of American and Continental Drugs, Herbs, and Essential Oils,
Manufacturers of Fluid Exts. (B.P., U.S.P., and non-officinal), Composition Essence, and Herb Beer Extract.
MEDICAL AND SWEET HERBS IN PACKETS. STRAMONIUM AND COMPOUND CUBEB CIGARETTES.
Agents for Messrs. Parke, Davis & Co.'s Concentrations, Fluid Extracts, and Pressed Herbs, also for Messrs. Keith & Co.'s Preparations. DEPOT FOR ALL NEW REMEDIES.
Price Lists, Samples, and Special Quotations on application. Foreign Indents receive special attention.

FOR ALL

CANINE AILMENTS

SPRATT'S PATENT, LIMITED,

DOG MEDICINES.

Show Cards supplied, also Pamphlets on Dog Diseases for gratuitous distribution.

Trade Terms of SPRATT'S PATENT, LIMITED, London, S.E., or your Wholesale House.

TRADE MARK REGISTERED.

LEECHES! LEECHES!

Warranted Healthy, Wholesale and for Exportation.
Choice quality, Hambro' speckled and Officinal Green. A constant supply always on hand. Delivered free to all parts of London daily.
Special Terms to Wholesale Druggists, Leech Merchants, and Exporters.
FITCH and NOTTINGHAM, Leech Breeders,
MARSEILLES AND 4, CANONBURY SQUARE, LONDON, N.

BURROUGH'S SPIRITUS RECTIFICATUS, P.B.

SPIRITS OF WINE CHEMICALLY PURE

The Best English Grain Spirit, free from Fusel Oil.
ALSO FINEST ORANGE WINE AND SHERRY FOR MEDICINAL PURPOSES.
CALE STREET DISTILLERY, LONDON, S.W.
Duty free for Exportation—also best Methylated Spirit at lowest prices.

EWEN'S LARD

GUARANTEED PURE
Original and Best Basis for Ointments, &c.
Adeps Præp.
Adeps Benz.
(EWEN'S)
Can be obtained through any Wholesale House.

Trade Mark. E.W.E.N'S CLARIFIED FAT WORKS PRIZE MEDAL 1862 BENZOATED LARD HATFIELD ST. BLACKFRIARS S.E. JAMES EWEN & SONS LONDON *Facsimile of Label.*

Trade Mark. E.W.E.N'S CLARIFIED FAT WORKS PRIZE MEDAL 1862 CLARIFIED FINE LARD HATFIELD ST. BLACKFRIARS S.E. JAMES EWEN & SONS LONDON *Facsimile of Label.*

Mutton, Beef, Veal, and Deer Suet and Beef Marrow,
Clarified Trotter and Neats' Foot Oil.

Every variety of EWEN'S TOILET SOAP from 56/- to 224/- per cwt.
Clarified Fat Works, Perfumery and Toilet Soap Factory,
5, HATFIELD ST., LONDON, S.E.

FREDK FINK & CO.

10 and 11, MINCING LANE, LONDON, E.C.

SPECIALITIES:
Glycerine—Gum Arabic—Gum Tragacanth—Pure Beeswax—Honey—Vanilla.

Do you make your Tinctures and Infusions with Fletchers' New Liquors? If not, send to the Manufacturers for a Trial Sample.

For Terms for Advertisements see page iii.

TRADE MARK

REGISTERED.

DR. JOHN FRANCIS CHURCHILL'S INHALANT

"SPIRONE" TRADE MARK

FOR THE TREATMENT AND CURE OF ALL

Diseases of the Lungs, Windpipe, Nose, and Throat,

Claims to be a Specific for all Congestive and Inflammatory conditions of the Respiratory Apparatus, and will be found efficacious in

COUGHS & COLDS, ASTHMA, BRONCHITIS,

Inflammation and Congestion of the Lungs, Pneumonia, Pleurisy, Whooping Cough, Croup, Diphtheria, Pharyngitis, Laryngitis, Catarrh, Sore Throat, Quinsy, Enlarged Tonsils, Hoarseness, Loss of Voice, Colds in the Head, Ozœna, Hay Fever, and all other Complaints of the Respiratory Organs.

Prepared only by the Inventor: None Genuine except such as bears the Trade Mark and his Signature upon the Bottle, on the Label over the Cork, and on the Wrapper,

JOHN FRANCIS CHURCHILL, M.D. (PARIS),

The Discoverer of the Specific Cure for Consumption, and of the Medicinal Properties of the Hypophosphites.

Price 4s. 6d. and 11s. per Bottle. Set of Apparatus for Administration, 15s. Pamphlets and Show Cards free on application.

THE SPIRONE COMPANY, LIMITED.

DEPOT—17A, DUKE STREET, MANCHESTER SQUARE, LONDON, W.

PUMILINE The only Pure Essence and Extract of Snow-grown Pumilio Pines.

FOR GOUT, RHEUMATISM, BRONCHITIS, SORE THROATS, AND CHEST AFFECTIONS.

THE SNOW-GROWN PINUS PUMILIO.

Sir MORELL MACKENZIE wrote, December 9, 1887.

"I have much pleasure in stating that I have made use of Oleum Pumilionis during the last twenty-five years, and that I consider it a most valuable preparation. It acts as an admirable tonic to the mucous membrane of the air passages in cases of chronic bronchitis and laryngeal catarrh. I am glad, therefore, to hear that the remedy is abeut to be used on a large scale, and I have no doubt the results will be highly satisfactory." (Signed) MORELL MACKENZIE, M.D.

Pumiline ALONE, with the single exception of Pinol, possesses the physical and chemical properties which give it the faculty of being administered with SAFETY. It is therefore essential for Chemists to use Pumiline, as it is the only preparation obtained from snow-grown Pumilio Pines.

For Trade Price Lists, Pamphlets, Analytical Reports, &c.,

G. & G. STERN, 11, BILLITER SQUARE, LONDON, E.C.

ROBINSON & CLEAVER'S ROYAL

IRISH CAMBRIC

Children's Bordered, per doz.	1/2	Hemstitched:	
Ladies' ... ... „	2/4½	Ladies' ... ... per doz.	2/11½
Gent's ... ... „	3/6	Gent's ... ... „	4/11

SAMPLES FREE. **POCKET HANDKERCHIEFS.**

IRISH DAMASK TABLE LINEN

SEND FOR SAMPLES, FREE.

Fish Napkins, 2/11 per dozen. Dinner Napkins, 4/6 per dozen. Table Cloths, 2 yards square, 2/11; 2½ yards by 3 yards, 5/11 each. Kitchen Table Cloths, 11½d. each. Strong Huckaback Towels, 4/6 per doz. Frilled Linen Pillow Cases, from 11½d. each. Initials, &c., woven and embroidered. Samples and Illustrated Price Lists, post free to any part of the World. **ROBINSON & CLEAVER,**

By Special Appointments to H. M. the Queen and H. I. M. the Empress of Germany.

BELFAST.

BEECHAM'S PILLS.

TRADE MARK.

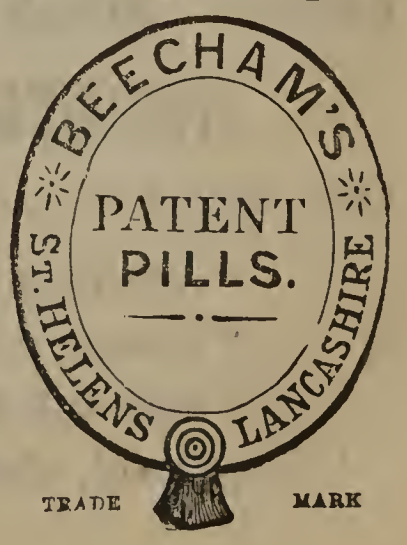
The most Marvellous Medicine of the Age for Bilious and Nervous Disorders, Indigestion, and Female Complaints.

The Demand is unprecedented, and the Sale is by far the Largest of any Patent Medicine in the World.

Prepared only, and Sold Wholesale and Retail, by

THOMAS BEECHAM,

ST. HELENS, LANCASHIRE, ENGLAND.



TRADE MARK

MUMFORD'S

FARRINGDON ROAD, LONDON, E.C.

PURE CRUSHED LINSEED IS NOW

17/- cwt. CARRIAGE PAID

To any Railway Station in England.

DRAPER'S INK (DICHROIC).

THE NEW BLACK INK, different from anything else ever produced.

Writing becomes a pleasure when this Ink is used. It has been adopted by the principal Banks, Public Offices and Railway Companies throughout Ireland.

It writes almost instantly Full Black.
Does not corrode Steel Pens.
Is cleanly to use and not liable to Blot.
Flows easily from the Pen.
Blotting-paper may be applied at the moment of writing.

May be had in *London* from Barclays, Newberys, Edwards, Sanger, Sutton. *Liverpool:* Evans, Sons & Co., Ayrton & Saunders. *Leeds:* Goodall, Backhouse & Co. *Exeter:* Evans, Gadd & Co. *York* and *Edinboro';* Raimes & Co. *Newcastle-on-Tyne:* Ismay & Co. *Coventry:* Wyleys & Co.

SOLE PROPRIETORS:

BEWLEY & DRAPER, Limited, DUBLIN.

GOLD MEDALS EDINBURGH AND LIVERPOOL EXHIBITIONS.

FRY'S

Pure Concentrated

COCOA

TRADE MARK.

Prepared by a new and special scientific process, securing extreme solubility, and developing the finest flavour of the Cocoa.

PURE — EASILY DIGESTED — ECONOMICAL.

From SIR CHARLES A. CAMERON, M.D., *President of the Royal College of Surgeons, Ireland, &c.*

"I have formed A HIGH OPINION OF ITS DIETETIC VALUE. I have never tasted Cocoa that I like so well. It forms a beverage pleasant both in flavour and odour. IT IS ESPECIALLY ADAPTED TO THOSE WHOSE DIGESTIVE ORGANS ARE WEAK."

36 Prize Medals Awarded to the Firm.

J. S. FRY & SONS, BRISTOL, LONDON, and SYDNEY.

VAN HOUTEN'S COCOA.

EASILY DIGESTED — PURE — SOLUBLE — MADE INSTANTLY.

INCOMPARABLY THE BEST & MOST ECONOMICAL.

Very strong & nutritious, THIS Cocoa is cheaper & more satisfying than tea.

"Admirable," "flavour perfect," "and SO PURE." } BRITISH MEDICAL JOURNAL. — "Delicate aroma," "PURE & unmixed," "goes a long way." } THE LANCET.

"Once used, always used."—HEALTH.

SAMPLE TINS GRATIS { through your grocer or chemist.

Mirabile Dictu

The Sacrifice.

L'incroyable!* Strange to relate, we believe there is not now a single maker or vendor of beer or extract of malt who does not admit that barley is the grain of all grains for malting. So far so good. But be not deceived, there are some piquant questions to be asked. We put these questions to ourselves, the foregoing admission the while being borne in mind, and the fact that we manufacture the Kepler Extract of Malt from the best barley only.

Is Extract of Malt an albuminous food, suitable to take the place of beef-tea? No. Is it ever given solely because of its nitrogenous constituents? No. Is it these that give an Extract of Malt its prime worth as an invalid food? No. Is it the albuminous principles of a grain that determine its value for malting? No. Questions such as these bring home to the mind the important fact that the best Extract of Malt, like beer, is made from barley only, and for other and vastly better reasons than the albumen it contains. But someone may say all this is a mistake; if you would make Kepler Malt from "barley, wheat and oats," it would contain more albumen, and be more tissue-forming. So it is said!

PINNING AN ERROR.

Admitting for the moment that it is vegetable albumen we are after (though it is not), how much would be the gain? The gain would be $-x$, or in other words *a loss of under one per cent.* Here are the most favourable figures the advocates of the change can ask. They are from "Blyth on Foods."

"*Substitution Mixture*" *of Wheat and Oats:*

Nitrogenous matters in Oats	11.73
,, ,, Wheat	12.42
	24.15
Average Albumen in "Substitution Mixture,"	12.075

(or under one per cent. less than Barley contains.)

We have then the following astonishing table:—

ALBUMEN IN BARLEY AND "SUBSTITUTION MIXTURE"—NO GAIN.

Albumen in Barley.	Mixture Wheat and Oats to be Substituted for Barley.
12.1	12.0¾

* It has been said that "Blyth's Foods" gives the quantity of nitrogenous substances in barley as 11.75. *It does not.* It gives 11.75 as the proportion in barley-*meal*, and 12.1 as that in barley, and 13.6 as in *barley-malt.*

The foregoing emphatically shows how grievously we would be deceived were we to adulterate our Barley with other grains and expect to enrich the Malt.

If it appear quite beyond belief that any should advise the substitution of "wheat and oats" for whole or part of the barley in Kepler Extract of Malt, what shall be said when it is known that *the above takes no account of the loss in carbo-hydrates and diastase*—a loss which is really enormous.

FINDING THE LOSS.

The chief value of a good extract lies in the amount of carbo-hydrates and diastase present, and it may now be shown at what cost the above loss (not gain, mind!) in albumens would be obtained were "wheat and oats" substituted for Barley.

"*Substitution Mixture*" *of Wheat and Oats:*

Carbo-hydrates in Oats	55.43
,, ,, Wheat	67.89
	123.32
Average Carbo-hydrates in Substitution Mixture, (or ¾ of what Barley contains.)	61.66

We have now with the carbo-hydrates a more striking table even than before with the albumens.

CARBO-HYDRATES IN BARLEY AND "SUBSTITUTION MIXTURE."

Barley.	Mixture Wheat and Oats to be Substituted for Barley.
82.20	61.66

Barley, therefore, contains 1/3 more carbo-hydrates than wheat and oats, and this extra amount has been known to be sacrificed in the supposition that there would be gain of say 33⅓ per cent. in albumens instead of an actual loss. This comes of trusting to rumours instead of experiment.

After submitting the foregoing, it may be asked—has it ever been demonstrated that one pound of "hash" composed of various inferior materials is equivalent in nutritive value to one pound of the finest beef?

VERDICT.

Every impartial verdict has been in favour of Kepler Extract of Malt. It is manufactured by ourselves in this country, and not imported in barrels or bought from other makers. Besides this, it is just exactly what it is claimed to be. From all sides comes the unanimous verdict—Kepler Extract of Malt is THE BEST.

The Kepler Solution and Kepler Malt Extract supplied to the trade in bottles, containing ¾ lb. and 1½ lb., at 22/- and 38/- per dozen. Retail prices, 2/6 and 4/- each. Supplied by all wholesale houses.

BURROUGHS, WELLCOME & Co., Snow Hill Buildings, LONDON, E.C.

Above Prices subject to usual discount.

TRUSSES

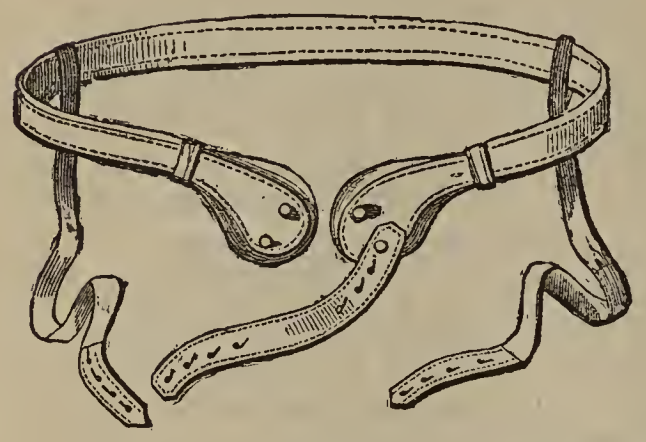


FIG. 2.

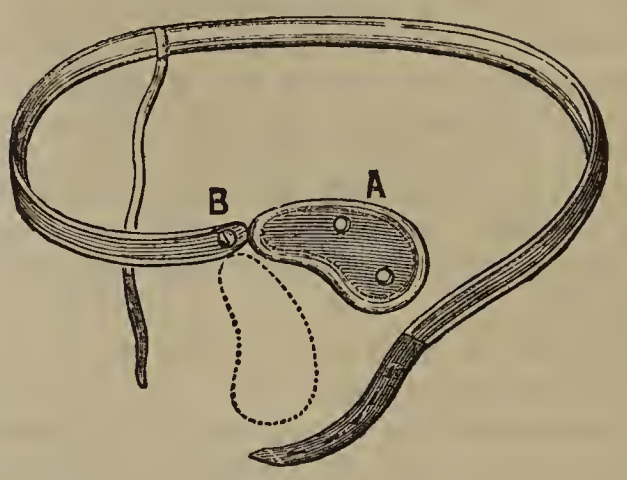


FIG. 5.

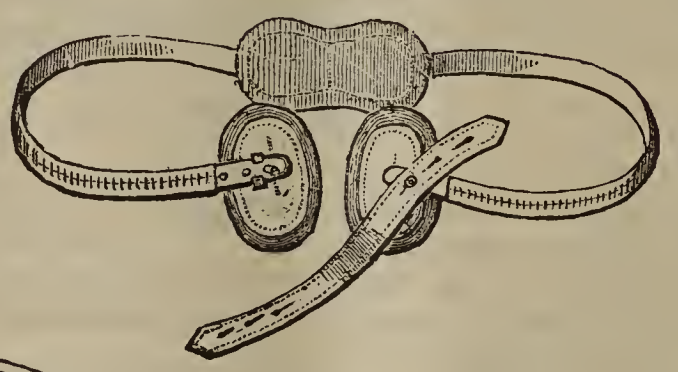


FIG. 4.

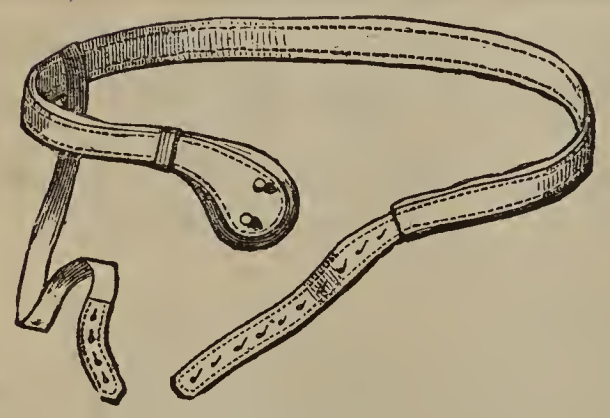


FIG. 1.

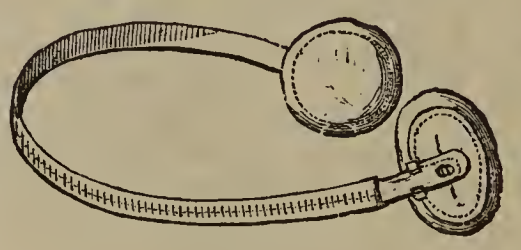


FIG. 3.

				PER DOZEN.	SINGLE.	DOUBLE.
No. 1368A.	FOR INGUINAL HERNIA,	Covered	Basil and Moleskin	(Fig. 1.)	13/6	(Fig. 2.) 23/-
„ 1369.	„	„	„ Red Morocco and Moleskin ...	(Fig. 1.)	16/-	(Fig. 2.) 26/-
„ 1376.	„	„	Salmon and Ody's principle, covered Basil and Moleskin	(Fig. 3.)	30/-	(Fig. 4.) 55/-
„ 1377.	„	„	Ditto, Superior Finish, covered Basil and Moleskin...	(Fig. 3.)	50/-	(Fig. 4.) 100/-
„ 1369C.	„	„	LYNCH'S "Adaptable," by means of which the pressure of the Spring can be increased or diminished at pleasure, and any obliquity of pad obtained, each	(Fig. 5.)	12/6	25/

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"THE MONTH."

Carbonaphtholic Acid.

Carbonaphtholic acid, a compound obtained by acting on naphthol with carbonic acid in the presence of sodium, has been added to the already long list of antiseptics, though it does not appear to present special advantages over others already in use (*Brit. Med. Journ.*, Nov. 3, p. 1002). A solution of 1 in 20,000 is said to delay the growth of putrefactive bacilli, one of 1 in 20,000 to kill the organisms, and one of 1 in 300 to stop advanced decomposition. It is therefore a powerful antiseptic, but it has proved poisonous to animals in large doses. It is described as being almost insoluble in water, soluble in alcohol and in ether, and sparingly soluble in solution of borax or of sodium phosphate.

Benzanilid.

Benzanilid, which was suggested last year as a possibly useful compound in therapeutics (*Pharm. Journ.*, [3], xvii., 886), is now reported by Dr. Kahn to have given good results as an antipyretic, especially in the treatment of children (*Apot. Zeit.*, Nov. 3, p. 871). Experiments were made with a series of anilids, but only benzanilid, acetanilid (antifebrin) and salicylanilid were found effective, benzanilid presenting an advantage over acetanilid in the absence of objectionable subsidiary action following its administration. Benzanilid ($C_6H_5CO-NH-C_6H_5$) is produced by the action of benzoyl chloride on aniline or by boiling together equivalent quantities of benzoic acid and aniline. It occurs as a white crystalline powder, insoluble in water, soluble in 58 parts of alcohol at 20° C. or 7 parts of boiling alcohol, and difficultly soluble in ether. The powder is dispensed for children in doses of 0·1 to 0·6 gram.

Pyrodin.

Acetylphenylhydrazine ($C_6H_5{\cdot}NH_2{\cdot}C_2H_3O$), another closely allied compound, is said to be the active ingredient of an antipyretic that has recently been brought out under the name "pyrodin." It is the subject of a paper in the current number of the *Medical Chronicle* (Nov., p. 89), in which Dr. Dreschfeld, of Manchester, records the clinical observations following its administration to patients suffering from various forms of fever. The general conclusions drawn are that pyrodin is a powerful antipyretic, specially applicable in cases of pneumonia, scarlet fever and typhus, reducing the fever temperature quickly and maintaining it at a low level for some hours. It produces marked perspiration, without nausea, vomiting or collapse. But when given in often repeated doses at short intervals it readily manifests toxic properties, the drug acting on the blood and producing hæmoglobinæmia. For this reason it should not be given (unless the temperature is very high) oftener than once in eighteen or twenty-four hours, and it is not safe to continue its use for more than a few days. As, however, pyrodin is a much more powerful antipyretic than either antipyrin, antifebrin, or phenacetin, it is rarely necessary to give more than one dose in twelve to eighteen hours. The dose for children is 3 to 4 grains, and for adults 8 to 12 grains. Pyrodin is a white crystalline powder, sparingly soluble in cold water. It would appear to approximate closely to "antithermin," a compound of phenylhydrazin and levulinic acid, which attracted passing attention as an antipyretic some time since.

Hydroxylamine.

The repeated suggestion of hydroxylamine, or oxyammonia ($NH_2{\cdot}OH$), a base in which one atom of hydrogen of ammonia is replaced by the hydroxyl group, as a possible substitute for pyrogallic acid and chrysarobin in dermatological practice, presenting the advantage of not staining the skin, has led to the publication of some details respecting it, for the guidance of pharmacists (*Pharm. Zeit.*, p. 659). The free base, only known in watery solution, is odourless and colourless. The most important salt is the hydrochlorate (NH_2OH, HCl), which occurs in well formed colourless strongly hygroscopic crystals, freely soluble in water, glycerin and alcohol. The solutions do not colour phenolphthalein, strongly redden blue litmus paper, but do not cause congo paper to turn blue. In testing for its purity, therefore, the bluing of congo paper would denote contamination with free acid. An aqueous solution should not be changed by the addition of potassium sulphocyanide or ferricyanide, or dilute sulphuric acid, and an alcoholic solution should not give a precipitate with alcoholic solution of platinic chloride. Heated on platinum foil it should leave no fixed residue. As hydroxylamine does not redden phenolphthalein, the hydrochloric acid of the compound may be estimated by the direct addition of normal potash solution, whilst the base may be estimated iodometrically, the reaction taking place according to the following equation:—

$$2NH_2OH, HCl + 4I = N_2O + H_2O + 2HCl + 4HI.$$

Aluminium Sulphite as an Antiseptic.

In a paper read recently before the Michigan State Medical Association Dr. Wade called attention to the value of the compounds of aluminium with sulphurous acid as non-poisonous and unirritating antiseptics (*Pharm. Record.*, Nov. 1, p. 347). He states that he has experimented with the sesquisulphite, which is insoluble in water, and the persulphite, which is soluble, this difference in physical properties rendering one or other of them applicable under the most diverse conditions. Although the exact germicidal power of these compounds has not yet been determined by experiment, Dr. Wade assumes that it is not below that of acetate of aluminium, which has been given as 1 to 6310, or somewhat less than half that attributed to mercuric chloride, and says that he has known 30 grains of the sesquisulphite to be taken without producing stomachic disturbance. Dr. Wade states that the insoluble sesquisulphite may be prepared by mixing the aqueous solutions of 10 parts of potash alum and 8 parts of sodium sulphite, washing the precipitate and carefully drying it. The persulphite may be prepared by heating the undried sesquisulphite with sufficient sulphurous acid to dissolve it and crystallizing without heat.

Atropine and Hyoscyamine.

The recent papers of Dr. Will upon the conversion of hyoscyamine into atropine (*Pharm. Journ.*, [3], xviii., 1046; xix., 245) have evoked a communication from Professor Ladenburg which, although mainly a record of negative results, presents points of considerable interest (*Berichte*, xxi., 3065). When, some years since, Professor Ladenburg obtained atropine by recombining the decomposition products of hyoscyamine, he was inclined to look upon these two bases as being physical, as well as chemical, isomers, standing in similar relation to each other as racemic acid and lævotartaric acid to one another, and to attribute a faintly lævogyre action of the

atropine observed to a slight contamination of hyoscyamine. But all attempts to split up the optically inactive atropine into a dextrogyre and a lævogyre product, as had been effected in the case of artificial coniine, were unsuccessful. Herr Will, also, it will be remembered, at first considered atropine to be optically inactive, and proposed to utilize the observation of the diminution of rotatory power in an alkaline solution of hyoscyamine as a measure of the progress of conversion of that base into atropine. But recently Messrs. Will and Bredig have attributed to a solution of pure atropine a faintly lævogyre property, and this has induced Professor Ladenburg to take up the investigation again, since this statement, if correct, would be inconsistent with his theory. After numerous recrystallizations of atropine he obtained it in a condition in which a 12·7 per cent. solution manifested no optical activity. Professor Ladenburg is therefore still of opinion that atropine is an inactive base which stands in relation to hyoscyamine as racemic acid does to lævotartaric acid. He admits that the conversion of atropine into hyoscyamine, which on several occasions he thought he had effected, has not yet been accomplished, the misleading appearances having been due to impurity of the atropine used; but he still believes that this conversion is possible.

Piperidine in Pepper.

The existence in pepper of a volatile alkaloid possessing strongly alkaline properties, is announced by Dr. W. Johnstone (*Chem. News*, Nov. 16, p. 235), who believes that the base in question is identical with piperidine. He states that he has found it in black pepper (0·56 per cent.), long pepper (0·34 per cent.), and pepper refuse, consisting principally of husks (0·74 per cent.). White pepper yielded it also, but in smaller quantity, and the larger proportion of piperidine in the husk Dr. Johnstone considers to be an explanation of the greater pungency of black pepper over white pepper. Piperidine ($C_5H_{14}N$) it will be remembered is a product of decomposition when piperine ($C_{17}H_{19}NO_3$) is heated with alkalies.

Imperialine.

A new alkaloid is reported to have been separated from the liliaceous *Fritillaria imperialis* by Herr Fragner, who has named it "imperialine" (*Chem. Repert.*, Nov. 17, p. 306). It was obtained by triturating the bulb of the plant with unslaked lime, drying the mixture in a water-bath, extracting with hot chloroform, shaking out the chloroform solution with solution of tartaric acid, precipitating this with sodium carbonate and recrystallizing the precipitate from hot alcohol. Imperialine, the yield of which was only from 0·08 to 0·12 per cent., is described as crystallizing in short colourless needles, very slightly soluble in water, but completely soluble in ether benzol, petroleum ether, amyl alcohol, chloroform and hot alcohol, the solutions acquiring a bitter taste. The crystalline hydrochlorate dissolves freely in water and in alcohol. The composition of the alkaloid is represented by the formula $C_{35}H_{60}NO_4$. Its physiological action is said to affect the heart, but in what way is not stated.

Saccharin.

Saccharin has been the subject of very contradictory statements as to its harmlessness or otherwise, and some of them at least were not free from the taint of personal interest. In view of the growing importance of this question, in consequence of the increasing use of saccharin for sweetening articles of diet, Dr. Thomas Stephenson and Dr. Woolridge have made a series of experiments for the purpose of determining whether this substance is poisonous when given even in excessive quantities and whether it interferes with the digestive processes when used in moderation. They report (*Lancet*, Nov. 17, p. 958) on the first point that two grams were given daily for five days to an underfed dog without any inconvenient results being observed, and that mice ate *ad libitum* food mixed with large quantities of saccharin without manifest influence on the health. In testing whether the antiseptic properties of the compound have the effect of stopping the action of organized ferments it was found that a 0·1 per cent. solution had no retarding influence on the peptic digestion; that a 0·25 per cent. solution slowed the process decidedly; and that a 1 per cent. solution greatly retarded it. But it is pointed out that a 0·1 per cent. solution of saccharin is the sweetening equivalent of 30 per cent. of sugar, an impossible dietetic quantity. The diastatic solution of starch was not hindered by 2 per cent. of saccharin. The ammoniacal fermentation of urine was retarded when saccharin was taken or added to the urine after excretion. Putrefactive decomposition of a pancreatic digestive mixture was not prevented by the admixture of 1 per cent. of saccharin. As experiments like the foregoing do not reproduce exactly the relations which would exist between the two factors in the stomach, experiments were made upon living animals, and it was found by *post-mortem* examination, that the ingestion of a gram of saccharin, equal in sweetening power to over eight ounces of sugar, had not in the least interfered with the digestion of a dog. The authors conclude (1) that saccharin is quite innocuous when taken in quantities largely exceeding what would be taken in any ordinary dietary; and (2) that saccharin does not interfere with or impede the processes of digestion when taken in any practicable quantity. To this they add their personal experience that saccharin may be taken for a considerable period without interfering with the digestive and other bodily functions.

Dioscorea villosa.

In the United States the rhizome of *Dioscorea villosa*, known popularly as the "wild yam root," "colic root," and "rheumatism root," and some preparations made from it, including the resinous principle called "dioscorein," have long been used, especially by the eclectics, in the treatment of colic. Nothing definite has hitherto been known as to the nature of the acrid principle to which they are supposed to owe their medicinal efficacy; but a recent examination of the rhizome by Mr. Kalteyer (*Amer. Journ. Ph.*, Nov., p. 554), has led him to the conclusion that it contains saponin or an allied substance in considerable quantity.

Filicic Acid.

The filicic acid separated from an ethereal extract of male fern by Grabowski, and pronounced by him to be dibutyrylphloroglucin ($C_{14}H_{18}O_5$) has been reinvestigated by G. Daccomo (*Berichte*, xxi., 2962). It was obtained as a shining faintly yellowish crystalline powder, melting at 179°–180° C., insoluble in water, almost insoluble in absolute alcohol, moderately soluble in glacial acetic acid and in ether, and freely soluble in chloroform, carbon bisulphide and ben-

zol. Analysis gave results corresponding with the formula $C_{14}H_{16}O_5$. With bromine in glacial acetic acid an acetic acid solution of filicic acid gave a monobromfilicic acid, and when boiled with aniline it gave a filicic acid anilid. Upon heating filicic acid in a sealed tube with water or hydrochloric acid isobutyric acid was split off and the residue combined with water to form a compound that upon oxidation yielded phthalic acid and a little oxalic acid. The conclusion of the author is that filicic acid is an isobutyric acid ester of oxynaphthoquinone.

Phyllotaonin.

In a paper entitled "Contributions to the Chemistry of Chlorophyll" ('Proc. Royal Society,' xliv., p. 449), Dr. E. Schunck describes a body under the name "phyllotaonin," obtained by the action of boiling alcoholic soda on chlorophyll extracted from grass leaves by ethyl alcohol. Phyllotaonin is obtained on spontaneous evaporation of its ethereal solution in regular flattened crystals or crystalline scales, which by reflected light appear of a fine peacock or steel-blue colour; the crystals are mostly opaque, but when very thin are transparent, and appear brown by transmitted light. Phyllotaonin is insoluble in boiling water, easily soluble in boiling alcohol and ether, but does not crystallize out on cooling. It is also soluble in benzol, carbon disulphide, chloroform, aniline and glacial acetic acid, but insoluble in ligroin. In concentrated hydrochloric acid it dissolves with a bright bluish-green colour. It is distinguished from phyllocyanin by the solution in glacial acetic acid, which is of a fine violet colour, giving a spectrum different from that of the ethereal solution, while the solutions of phyllocyanin in ether and acetic acid, both of which are of a dull green colour, give the same spectrum.

Milk.

In a recent communication to the Academy of Sciences (*Compt. Rend.*, cvii., 772) M. Béchamp has put forward some views upon the nature of milk that are hardly in accordance with those generally received, but he also adds the experimental data upon which they are based. His conclusions are (1) that milk is not an emulsion, the milky globules not being globules of naked fat, but true free adipose vesicles; (2) that cow's milk, besides casein, contains other albumenoid matters, not free, but dissolved in combination with alkalies; and (3) that milk can curdle spontaneously without the assistance of foreign ferments.

Yeast in Medicine.

Last month reference was made to the probably benign influence of some of the lower organisms, and since then a communication by Dr. Heer has appeared upon the good results obtained by him in the treatment of some contagious diseases with yeast (*Apot.-Zeit.*, Nov. 7, p. 883). Dr. Heer speaks of "bottom yeast" as a remedy against diphtheria acting with a surprising rapidity equalled by no other; he states also that he has used it with very favourable results in scarlet fever, dysentery and infantile diarrhœa. The dose for children up to three years of age is 1 to 3 grams every two hours; for older children 6 to 8 grams; and for adults 10 to 15 grams. There need be no fear of digestive disturbance following the administration. Dr. Heer urgently asks for the clinical testing of his statements, and expresses the hope that by the progress of microscopy he may be enabled soon to make out the relations of the yeast fungus to the pathological bacilli of the diseases referred to, and thus confirm theoretically his practical conclusions.

Cerium Oxalate for Cough.

Cerium oxalate is recommended by Dr. Cheesman, of New York, as a valuable remedy for cough in every stage of phthisis, but especially for the irritant cough of the earlier stages (*Med. Chron.*, Nov., p. 152). In chronic bronchitis it has also been used with good results, as well as in spasmodic asthma, whooping cough and measles. The initial dose recommended by Dr. Cheesman is 5 grains, to be given early in the morning or at bedtime, or at both times, with intervening doses as required. If relief is not obtained the dose may be increased to 10 grains, or more, and no dangerous symptoms have been observed to follow its administration even when given in 20-grain doses several times a day. The effects are best when the salt is administered on an empty stomach and in fairly large doses, rather than when the same quantity is divided into more frequent smaller doses. The dry drug seems to be the most successful form for administration.

Salicyl- and Thymol-Mercury.

Good results in the treatment of syphilis are reported to have followed the intramuscular injection of a 10 per cent. suspension of salicyl- or thymol-mercury in liquid paraffin (*Münch. med. Wochensch.*, Nov. 6, p. 774). Six or eight injections are reported to bring about the disappearance of the symptoms in a rapid and energetic manner. In this respect thymol-mercury is said to be nearly equal to a 10 per cent. "calomel oil," and to far exceed "gray oil."

Litmus and Light.

It is known that aqueous solutions of litmus preserved in closed flasks from contact with air lose after a time their blue colour and become more or less brown, but regain their blue colour by contact with air, so that such a discolorized solution can be used like solution of white indigo for the detection of oxygen. The discoloration has been attributed by M. Dubois to the deoxidation of the blue colouring matter by the action of micro-organisms, but some changes observed by M. Bellamy are hardly sufficiently explained in this way (*Journ. Pharm. Chim.*, Nov. 15, p. 433). Four vessels of about 150 c.c. capacity were filled with a dilute decoction of litmus, and sealed at the lamp so as to leave only one small bubble of air in each. After being left about six weeks in a place where they were exposed equally to direct and diffused sunlight the liquid in each case had become perfectly colourless, but in another fortnight the liquid in one vessel showed a violet-blue colour, which went on augmenting until in another month it had regained the initial intensity. Meanwhile the contents of the other vessels, under apparently precisely the same conditions, remained colourless. The blue liquid was then placed in a dark place, where it again lost its colour, but only to recover it after a short exposure to direct sunlight. In this way the same liquid underwent decoloration fourteen times and restoration of colour thirteen times in about twenty-five months, when an accident put an end to the experiment. Attempts to repeat the experience under similar conditions were only successful in two cases, though the cause of failure in the others was not made out. M. Bellamy raises the question whether the changes observed were due to the pre-

sence of organisms that were inert in obscurity but became active under the influence of light, or whether they were due to purely physical causes.

Morrhuic Acid.

In addition to the six bases obtained from cod liver oil by Messrs. Gautier and Mourgues (*ante*, pp. 62 and 345) they have discovered the presence of a substance that is of importance by reason of its relative abundance, in presenting the characters of both an acid and a base, and from its probable connection with the existence of vegetable lecithines. This substance is termed morrhuic acid, and it exists in the oil as a complex instable compound, behaving like ordinary lecithine in yielding glycerin, phosphoric acid and a complex acid when heated with acids or alkalies. The authors ascribe some of the beneficial action of cod-liver oil to the presence of lecithines, which yield phosphorus in a readily assimilable form.

Bumping in Liquids.

The inconvenience of "bumping" during the boiling of a liquid is best avoided, according to W. Markownikoff, by introducing into the liquid a few very thin capillary glass tubes, 3 to 10 mm. in length, sealed up at one end. The abstractor of the original communication for the *Journal of the Chemical Society* (Nov., p. 1155) states that he has tried this device and found it invaluable, especially in the distillation of concentrated acids. He further recommends that the tubes used should be of different sizes, so that they may float in different layers of liquid. Subsequently to the publication of the foregoing, Mr. C. Tomlinson has pointed out (*Chem. News*, Nov. 16, p. 235), that as far back as the year 1869, in a communication to the Royal Society on the action of nuclei in liberating vapour from boiling liquids (*Pharm. Journ.* [2], x., 716), he had stated that porous nuclei act by the force of capillarity and subsequently that "a short bundle of fine capillary tubes, united like a faggot by a thread in the centre," would act as an active nucleus in liberating vapour. Indeed, he stated specifically that such a bundle, weighing only 10 grains, put into a retort from which methylated spirit was being distilled raised the amount of distillate in the ratio of 100 : 110.

Gynantherous flowers.

At a meeting of the Royal Botanical Society on November 8, Professor Bayley Balfour exhibited a foxglove, in which the stamens of each flower had all been converted into carpel-like processes bearing ovules in an exposed position. Specimens of the poppy with stamens similarly modified were also shown (*Gard. Chron.*, Nov. 24, p. 608).

Cleistogamous plants.

Several illustrations of the way that certain plants, which although grown in a lawn and consequently cropped close, are yet able to spread readily by means of cleistogamous flowers, were shown at a recent meeting of the Royal Horticultural Society by Pofessor Henslow. The plants shown were *Cerastium glomeratum*, *Trifolium procumbens*, *Sagina procumbens*, *Alchemilla arvensis*, *Veronia arvensis*, *Poa annua* and *Montia fontana*.

Valeriana officinalis.

An interesting note on the indigenous forms of *Valeriana officinalis* appears in the *Journal of Botany* for November, from the pen of Mr. W. H. Beeby, one of the most careful of our British Botanists. He considers that the plants now described as varieties under the names *Mikanii* and *sambucifolia* should be regarded as distinct species. He has cultivated the plants side by side, and points out differences of mode of growth, of colour, of the leaves, also in size, in date of flowering, in form of the fruit, in the creeping roots and in the aroma. He finds that *V. Mikanii*, the plant which grows in drier situations, in or near woods on chalk hills, is stronger in odour, and that it is almost impossible to protect it from cats, while they would not touch the *V. sambucifolia*. The latter, which grows in damp places, he considers to be the common plant in Britain, a statement in which most field botanists will probably agree with him. One difference between the two plants is worth noting, since it characterizes the plants when not in flower. This difference consists in the fact that the root leaves of *V. Mikanii* spread flat on the ground, whilst those of *V. sambucifolia* are erect or suberect.

Old Plant Names.

An interesting list of plant-names in use one thousand years ago is given in the *Gardeners' Chronicle* (Nov. 3, p. 503) by the Rev. Canon Ellacombe. In some cases it is easy to recognize the present names of medicinal plants; others, however, are quite different. Thus garlec, uuermod, popeg or popaeg, iuu and dil, are easily recognized as garlic, wormwood, poppy, yew and dill; but thung, merici, hymblicæ, biscopwort, clifæ, wyr, hunæ or biowyrt (honey or bee wort), belonæ and gerwæ are much more unlike the words at present used, and would hardly be recognized as the respective equivalents of aconite, parsley, hemlock, vervain, clivers, myrtle, horehound, henbane and yarrow. The old name for fungus, suamm, is evidently the equivalent of the present German word schwamm.

CULTIVATION OF NUTMEGS IN NEW GUINEA.*

BY CAPTAIN JOHN STRACHAN, F.R.G.S., F.R.C.I.

Paddling into a little cove on the south side of the bay, we landed beside a clear rippling stream, and, having ordered the whole of the men to march in Indian file in front, we started by a little rugged path into the mountains, with my interpreter immediately behind me and the Rajah just in front. Every foot of the journey, which was laborious in the extreme, disclosed fresh scenes of verdure and tropical splendour. Winding along the sides of deep ravines, sometimes dragging ourselves up by the creepers and undergrowth, we ultimately attained an altitude of about 1,000 ft. above the sea, and then entered the nutmeg country. Here we halted and rested. The Rajah pulled some of the nutmegs, and explained how far they were from being ripe. Having rested sufficiently, we again started forward, and after scrambling along for about an hour, we gained a fine piece of table-land, over which we travelled for about another half-an-hour, when we reached three houses erected in the very heart of the forest. These were used by the natives for drying the nutmegs. The country was everywhere magnificent, and the aroma of the spice-laden air delicious. Nutmeg and other equally valuable trees were everywhere growing in great profusion. The fruit of the nutmeg in appearance resembles a pear, and when ripe opens and displays the nut covered with a beautiful red coating of mace. The nuts are then picked from the tree, put into baskets and taken to the houses, where they are husked and placed on shelves. They are then partially roasted over a slow fire until all the moisture is extracted. After this they are cooled and carried down to the village in nets ready to be bartered to the Bugis, Arabs, and other traders who frequent the Gulf in their small prows or junkos at the proper season.

* Reprinted from the *Tropical Agriculturist*.

GENERAL ORDER RELATING TO DRAWBACK ON ALCOHOLIC MEDICINES FOR EXPORT.

Inland Revenue Office, Somerset House,
London, W.C., November 26, 1888.

The Lords Commissioners of Her Majesty's Treasury having sanctioned changes in the conditions under which certain tinctures, liniments, or medicinal spirits (hereinafter referred to as "Tinctures") may be exported, and having also authorised repayment of the duty charged on the spirits wasted in the manufacture of such tinctures, etc., which by careful investigation is estimated to amount to 4 per cent. on the quantity actually exported—

It is ordered:—

1. That certain tinctures may be exported or shipped for use as ship's stores by licensed rectifiers, or compounders, in bottles varying in size from one imperial pint to half a gallon, packed in cases containing not less than five bulk gallons.

A case may contain tinctures of different kinds, but all the bottles in the same case must be of the same size, and filled, by measure, with one or more exact pints.

2 The tinctures must have been made from spirits of the initial strength either of proof spirit or of rectified spirit (*i.e.*, spirit of 56 o.p.).

3. The name of the tincture, and whether prepared from proof or rectified spirit, must be stated on a label attached to each bottle, and every case must be branded or inscribed with the progressive number and distinguishing mark, the bulk quantity contained therein, the name of the maker, and the words "medicinal tinctures."

If any of the tinctures are dangerous to life, the word "poison" must be added on the inside labels.

4. The rectifier, or compounder, intending to export tinctures must give twelve hours' notice, on a new form (No. 114–4) which has been prepared for the purpose. The officer must attend at the notice hour and check the contents of the bottles by seeing one in twenty emptied into a suitable stamped imperial measure provided by the rectifier or compounder. He must take account of the number of bottles, compare the contents of the cases with the specification in the notice, and see the cases packed and closed. Every case must be securely fastened with tape or wire sealed by the officer with a revenue seal. The full particulars of the several cases and the total bulk quantity of each consignment must be entered in a suitable page in his survey book. . . .

The officer should certify at the foot of the notice that the contents of the cases agree with the specification.

5. At the time of packing one sample of not less than half-a-pint must be taken from each kind of tincture, of each initial strength, from any number of cases not exceeding five, and an additional sample of each kind and initial strength for every further number of five cases or fraction of five contained in the consignment. These samples are to be labelled with the name of the tincture, and whether prepared from proof or rectified spirit, and are to be sent to the laboratory, Somerset House, and the original notice aforesaid forwarded to the laboratory by the first post.

An ordinary spirit certificate showing the number of cases and total bulk gallons must be sent with the goods to the ship's side, and two full copies of the notice must be forwarded by first post to the proper Officer of Customs. That officer will certify to the shipment of the goods at the foot of each document, and forward one to the Collector of Inland Revenue, and the other to the principal of the laboratory.

Bond, with one surety, for the due exportation of the tinctures, must be given by the rectifier, or compounder, before the removal of the goods. The bond may be a general one.

6. There is no objection to the filling up of the bottles sampled with tinctures of the same kind and strength should the rectifier, or compounder, desire to do so.

On receipt of the completed certificates from the laboratory, the collector will pay drawback at the rate of 10*s.* per proof gallon on the quantity calculated from the bulk ascertained at the time of packing, and the strength shown in the laboratory return, together with 4 per centum thereon for loss in the process of manufacture; that is, assuming the proof quantity to be 100 gallons, drawback at 10*s.* is to be paid on 104 proof gallons assumed to have been used in the manufacture, and so on in greater or less proportion.

7. The ordinary allowance of 4*d.* per gallon as on British compounded spirits is to be paid on the quantity of proof spirits actually exported.

8. When more than one sample has been taken of each kind of tincture, the average of the strength of such samples is to be taken in calculating the proof quantity.

9. It must be understood that these regulations apply only to medicinal preparations exported in bottles, and that sulphuric ether, chloroform and chloral hydrate, or any derivative of methylated spirit, are expressly excluded.

A list of the articles which may be exported under this order is annexed. Any extension required must be the subject of application to the Board.

By the Board,

ROBERT MICKS.

Schedule of Tinctures, Liniments, or Medicinal Spirits prepared according to the British Pharmacopœia and allowed to be exported under the above order.

Acid. sulphuric. aromatic.
Liniment. aconiti.
„ belladonnæ.
„ camphoræ comp.
„ opii.
„ saponis.
Spirit. æther. nitrosi 0·850 Pharm. Lond.
Spirit. æther. nitrosi 0·845 Pharm. Brit.
Spirit. ammon. aromat.
Tinct. aconiti.
„ aloes.
„ arnicæ rad.
„ asafœtidæ.
„ aurantii.
„ „ recentis.
„ belladonnæ.
„ benz. comp.
„ buchu.
„ calumbæ.
„ camphor. comp.
„ cannab. indic.
„ cantharid.
„ capsici.
„ cardamon. comp.
„ cascarillæ.
„ catechu.
„ chirettæ.
„ cimicifugæ.
„ cinchonæ.
„ „ comp.
„ cinnamon.
„ cocci.
„ colchici semin.
„ conii.
„ croci.
„ cubebæ.
„ digitalis.
„ ergotæ.
„ ferri acetatis.
Tinct. ferri perchlorid.
„ gallæ.
„ gelsemium.
„ gentianæ comp.
„ guaiaci.
„ „ ammon
„ hyoscyami.
„ iodi.
„ jaborandi.
„ jalapæ.
„ kino.
„ krameriæ.
„ laricis.
„ lavandulæ comp.
„ lobeliæ.
„ limonis.
„ lupuli.
„ myrrhæ.
„ nuc. vomicæ.
„ opii.
„ „ ammon.
„ podophylli.
„ pyrethri.
„ quassiæ.
„ quinæ.
„ „ ammoniat.
„ rhei.
„ sabinæ.
„ scillæ.
„ senegæ.
„ sennæ comp.
„ serpentariæ.
„ stramonii.
„ sumbul.
„ tolu.
„ valerianæ.
„ „ ammon.
„ veratr. virid.
„ zingiberis.
„ „ fort.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 1, 1888.

Communications for the Editorial department o the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

DRAWBACK ON PHARMACEUTICAL PREPARATIONS FOR EXPORT.

A VERY important step has just been taken towards removing the disadvantage under which British manufacturers of alcoholic pharmaceutical preparations have hitherto laboured as compared with foreigners. Owing to the necessity of using spirit liable to duty in making all preparations of the British Pharmacopœia into the composition of which spirit enters, and also to the absence of any provision for obtaining drawback when such preparations are exported, it has been impossible for British manufacturers to compete in price with foreign makers, and consequently the loss of trade to this country has been considerable. Although such a state of things is justly capable of being regarded as a serious grievance, there is in most instances no shadow of ground for complaint that the use of pure spirit liable to duty is held to be indispensable in making pharmaceutical preparations. That is, in reality, not at all a matter of excise requirement, but is an obligation imposed upon all makers of pharmaceutical preparations by the authority succeeding the three colleges of physicians by whom the direction to use pure spirit for such preparations was originally given. Nor is it a matter that has hitherto been considered as justifying complaint, that spirit used for medicinal preparations which are consumed in this country should be held liable to the payment of the same excise duty as it would be if consumed in the form of beverages or otherwise. But as regards the export trade in medicinal preparations containing spirit, the interests of British manufacturers have been unnaturally damaged by the necessary payment of duty on the spirit used in making them. This disadvantage has now been to a very great extent removed by the sanction given by the Lords Commissioners of Her Majesty's Treasury to changes in the conditions under which alcoholic pharmaceutical preparations may be exported. The chief feature of change in this respect consists in the authority given for the repayment of the duty charged on the spirit actually contained in the articles exported, as well as that ordinarily wasted in their manufacture, which has been estimated by careful investigation to amount on the average to four per cent. additional.

The altered conditions under which the export of pharmaceutical preparations containing alcohol is to be carried out in future have been specified in a General Order of the Inland Revenue Department, dated 26th November, and the document is of such importance that we have reproduced it in full in the present number of the Journal. It may appear at first sight that some of the conditions to be complied with, and some of the restrictions still maintained, are in excess of what is necessary for the protection of the Revenue; but we believe that closer consideration will lead to the conviction that the concessions made in favour of British trade interests are as full as could be safely adopted at the present. Since there are always people who will try to take undue advantage of such concessions and to abuse them, it has probably been deemed necessary to bear that in mind, and for such reason to keep them within certain limits. Moreover the exclusion of ether, chloroform and chloral hydrate from participation in the benefits arising from the new regulations is an unavoidable consequence of the previous permission to make those articles from methylated spirit. For the same reason all pharmaceutical preparations in which those articles are used, must necessarily be excluded from the schedule of preparations on which drawback is to be allowed. Otherwise drawback might be claimed improperly in respect of preparations containing ether, chloroform or chloral hydrate made from methylated spirit, and the Revenue thereby defrauded. This would be especially possible in the case of chloroform and preparations containing that substance, since it is well known that there is at least very great difficulty in distinguishing between rectified chloroform made from methylated spirit, and that made from pure spirit. Whatever deficiencies, however, there may be in the regulations now issued by the Board of Inland Revenue, it must be borne in mind that they bear throughout evidence of having been drawn up in a spirit of concession and with a desire to meet the requirements of legitimate trade. The concluding sentence of the Order, stating that any extension required must be the subject of application to the Board, may be read in that light, and we may add that there is every reason to believe applications for extension of the privileges now granted would be favourably received if it could be shown that they were sought on a sound and legitimate basis in reference to trade transactions of sufficient magnitude.

At a meeting of the Chemical Committee of the London Chamber of Commerce, held last Wednesday, the decision arrived at respecting the export of alcoholic medicinal preparations in bond was made known by the Chairman, Mr. TYRER, to

whom, in conjunction with Mr. UMNEY, manufacturers engaged in that trade have especial reason to be grateful, for the energy, perseverance and discretion with which they have worked at this subject and eventually brought it to a successful issue. In doing this they have of course been aided by the co-operation of their colleagues, and the organization of the London Chamber of Commerce has proved of material utility in affording an appropriate medium for bringing this matter of trade interest under the cognizance of a Government department.

We have been requested to state in regard to the next evening meeting of the Society, which has been advertised to take place on Wednesday, the 12th December, that it has been found necessary to postpone the meeting until the following day, Thursday, the 13th of December. On that occasion a paper is to be read by Professor Dunstan, and several of the visitors who had intended to be present will be engaged on the Wednesday in the proceedings connected with the presentation of a testimonial portrait of Professor A. W. Williamson to University College. It is to enable them to be present at the Society's meeting that a postponement to Thursday has been decided upon, and is notified in the official advertisement this week.

* * *

According to some official returns, quoted in the *Pharmaceutische Zeitschrift für Russland* for October 16, the pharmaceutical body in European Russia, excluding five governments from which no returns have been received, consisted at the end of 1886 of 4032 pharmacists and 2025 pupils. The largest number in any one place was in the city of St. Petersburg, where there were 382 pharmacists and 127 pupils; then followed Moscow with 346 pharmacists and 130 pupils; and Warsaw with 232 pharmacists and 65 pupils. In other places the pharmacists were much more scattered, the highest return for a "government" being 200 (Livonia), whilst in many other governments the number was considerably below 100. The total numbers in the entire Russian empire are given as 4328 pharmacists, which indicates that in the Asiatic provinces also, as might be expected, qualified pharmacists are not numerous. For instance, in Siberia there were only 37 pharmacists and in a large district in Central Asia only 9. In European Russia the authorized pharmacies numbered 2315, in which during the year 1886 12,532,192 perscriptions were dispensed, or an average of 5413 to each pharmacy, though in the cities this number was trebled. The entire returns of the 2315 pharmacies for the year was about £1,454,000(10,574,153 roubles), rather over two-thirds being for prescriptions and the remainder for sales. The average charge for dispensing each prescription was about 1*s.* 5*d.* (50·57 copecks).

* * *

The next meeting of the School of Pharmacy Students' Association will be held on Thursday, December 6, when Mr. C. W. Andrew will read a note on "The Methods of Estimating Sal Volatile," and Mr. W. A. Salter will give a Report on Materia Medica.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN EDINBURGH.

The first Evening Meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Wednesday evening, November 21, at 8.30. Mr. William Gilmour, F.R.S.E., in the chair.

The minutes of the last meeting having been read and adopted, apologies for absence were intimated from Provost Watt, Haddington, and Mr. Daniel Frazer, Glasgow.

The Chairman then proceeded to deliver the following:—

INAUGURAL SESSIONAL ADDRESS.

BY WILLIAM GILMOUR, F.R.S.E.

Gentlemen,—Before commencing the work of the evening proper, allow me for a moment to refer to the recent changes which have taken place in the Executive. You all know of the resignation of Mr. Baildon, first as a member of Council and immediately afterwards as Chairman of the Executive. Mr. Baildon has left us after doing many years' service as examiner, as member of Council and as Chairman of this Executive, and in now, as it were, shaking hands with him at the parting of the ways let us bid him God speed in the new and varied labours in which he has now engaged. Naturally, under the circumstances of Mr. Baildon's resignation, Mr. Watt should have stepped into the chair, and no doubt would have done so had not a more honourable position been reasonably anticipated for him. I am very glad to think that Mr. Watt has been elected Scottish representative on the Council, and I am sure a more fitting or worthy representative we could not get. It is a very suitable arrangement also that Mr. Watt should still retain the position of Vice-Chairman of the Executive, as this will bring him into direct touch with our General Purposes Committee, which consists of the members of the Executive resident in Edinburgh, and who conduct the arrangements for our Evening Meetings, as well as much of the detail work of the Society going on from week to week, and for which purposes the whole Executive are not summoned. As regards myself I am going to say nothing. I have already thanked the Executive for electing me to the honourable position of Chairman. My past record is not unknown to you, and it will be my endeavour in the future not to belie the past.

These various changes, gentlemen, have taken up considerable time and delayed the opening of our winter session for some little time. I do not know if this would so much matter were it not for one thing, namely, that we have had no time to arrange for an opening lecture. It was the wish of the Executive that our scientific meetings should be opened by one of our leading professors—probably an honorary member of our Society—but the time was too limited. We have got, however, valuable promises of help for other sessions, and for these promises as well as for the spirit in which we were met by those we approached for help, we are thankful, and will certainly avail ourselves of them on some future occasion. If the feeling of regret at the necessity which compels me to take up your time to-night could be lessened, it would be in the thought that probably I may be able to touch on one or two subjects which will excite your interest and provoke some discussion. I have not had time to prepare any elaborate treatise, but for one who has now been engaged for nearly thirty years in pharmaceutical work, and who during the greater part of that period has taken some little part in pharmaceutical politics, and who moreover has formed strong opinions on certain subjects, it should not be difficult to tread on the pharmaceu-

tical corns of some, and to excite their argumentative faculties. If I should do so, I hope you will not spare me, for as "iron sharpeneth iron," so does a thorough going discussion polish off the more acute angularities of our opinions.

Now, gentlemen, having used the expression pharmaceutical politics let me here emphasize the importance of an intimate acquaintance with the past history of pharmacy at the present time, when so many questions are agitating the pharmaceutical mind. No one, I venture to say, can rightly estimate the true position of pharmacy at the present time, nor form an intelligent opinion upon the many important questions as presently discussed without being thoroughly intimate with its history for the past fifty years. I confess I have often been astonished at the—well, it would not be polite to say ignorance, and yet I cannot get a better word—of many regarding the modern history of their own profession. There is nothing I think more enjoyable, nor do I think there is any study more profitable, pharmaceutically, than that of going back over the past history of pharmacy, and comparing it with the questions which are being discussed at the present moment. There is not for example a decade during the past fifty years, and I take this period as representing the true development of modern pharmacy in Great Britain, in which the very questions which are now agitating the pharmaceutical world have not been the very questions faced, and, in one way or another, met. Education, examination, curriculum, poisons regulations, and even prices, have during all these years been in the forefront; and how, I ask, can we deal with such questions intelligently at the present time, unless we review the past and gain experience for the future?

Viewing it, however, from this standpoint it will be asked, "Is there no progress?" Is pharmacy to be a continual record of tread-mill experience, ever turning, and yet never advancing? To this my reply is that pharmacy has no finality any more than any other art or science. The questions of to-day will be the questions of to-morrow, only from a different, and certainly in the case of pharmacy, from a higher platform. During all these years we have been steadily advancing, and if the Pharmaceutical Society had no other apology for its present existence it would have it in the fact that it is the living embodiment of all that is higher and progressive in pharmacy. The question is often asked, "What has the Pharmaceutical Society done for us?" My reply is that it has ever nourished the very highest aspirations of pharmacy; it has consolidated, centralized and vitalized all that was previously chaotic and without life in pharmacy, and above all, it has infused into the whole mass a feeling of professional responsibility, dignity and brotherhood which never previously, and which probably under no other circumstances could ever have existed. Do not for a moment suppose that I have come forward as the apologist of the Society. Granted that during its career of nearly half a century it has done many things that it ought not to have done, and left undone many things that it ought to have done, the fact remains, and this great fact is not sufficiently recognized by the mass of grumblers outside the Society, namely, that without its influence they would not at the present moment hold the honourable position which they do hold. They enjoy all the elevating influences embodied in and emanating from the Society, and yet they coolly ask, "What has the Society done for us?" Now, gentlemen, I would like to emphasize this aspect of the question, not so much because it is an aspect that is far too much overlooked in these days, as because it is to my mind in this vitalizing and centralizing power the future hope of pharmacy lies.

I confess that I have not much hope of any Act of Parliament doing much good for us, even if there was the least chance (which there is not) of us getting something of this kind to help us at this time. I know that in saying this I am sure to offend someone, but I am stating honestly my strong conviction, formed after much consideration of the subject, both in the light of our past history and present position. Legislation *may* possibly do something to protect true pharmacy in the future, but we need never look to it to advance it in any degree, and I confess that it is in the advance of pharmacy that my chief hope for the future lies. Rest assured of this; it will never be advanced by Act of Parliament passed for the purpose. Of course this is a kind of Job's comfort to those who are smarting under all the evils of keen competition, reduced prices and general depression of trade presently existing. I have purposely said presently existing, for I do think we are just now passing through a kind of crisis in the history of pharmacy, out of which something very different in the future may be evolved. Whether this may end in the creation of two orders—the order of a trader in drugs, and the higher order of an educated pharmacist, I cannot as yet say, but this I can foretell, namely, that the true advance of pharmacy in the future will never be dependent upon prices or depression of trade. Pharmacy has already attained a position in which retrogression is next to impossible, and in which prices and competition and all factors of that kind are but of very secondary importance to the body corporate, however vital they may be to the individual.

Now, gentlemen, a crisis such as we are now passing through occurs every now and again in almost every profession and business, and whilst we should be thankful that it does not retard, and often even developes the "increasing purpose," to use the poet's words, the cry will still come from many in the desire for self-preservation "but what are we to do?" or more distressing still, "what can we do?" I am afraid I am too old myself now, and too much imbued with the pharmaceutic spirit, to develop the trader instinct and enterprise, but I will tell you what has hitherto stood me in good stead; I have increasingly endeavoured to develope a more *intense personality* in my daily work. I have tried, and I think not without success, to show that there is a living intelligent personal element permeating every department and every action, and this living intelligent influence I am persuaded, so far, at least, as we are individually concerned, will ensure, if not great success, at least what has not infrequently of late been styled "the survival of the fittest." I am afraid that I am now riding a hobby of mine, and yet if any one were to ask me to define "intense personality" in connection with pharmacy I am afraid I would find it difficult to do so. Some pharmacists never develope any individuality, and therefore they cannot be expected to do anything else than drift; others develope too much and—well, end in quackery. One fitting example, however, of this "personality" which I refer to I may touch upon in detail for a single moment, as it affects us to a considerable extent here.

Pharmacists have as a rule in Edinburgh retained the confidence of the medical profession of late years, and in my own experience medical practitioners have to a very considerable and increasing extent depended upon us for information regarding the composition and compatibilities of new remedies. It is not to be expected that in their busy lives they can get up and be thoroughly acquainted with all the chemical reactions of the numerous and important remedies introduced from time to time. They have consequently learned to depend upon getting a short but concise description of the subject embraced, probably, in about five minutes talk with an intelligent pharmacist, in whom they have confidence, rather than look up all kinds of authorities at an intolerable loss of both time and patience.

I need not dwell upon the confidence which is established in the medical mind when they find a pharmacist thus thoroughly up in his subject. It is just possible that I attach too much importance to this side of my "personality" (and remember it is only one side of it), but allow me to give you one example out of very many which have recently come under my own observation. A medical gentleman whom I did not know called the other day regarding the compatibility of two new remedies which he had prescribed. On mixing with water, the two seemed to form a solid and useless mass. The chemist to whom the prescription was taken, on finding out this peculiarity, declared the mixture was an incompatible one, and as such it was sent back to the medical gentleman. Now the fact was, that the mixture only required the addition of a little spirit to make it an elegant, and, I may add, a useful remedy, and this any chemist should have known or discovered for himself after a few minutes investigation.

I might multiply instances of this kind, but allow me to give you just one more, not so much because it happened the other day, as that it has its humorous side as well. A student asked me if I kept *dioxide* of manganese. Thinking that he was using a little "chaff," as students with a very little knowledge are apt to do, I thought I would take the first word in the chaffing and asked him where he got the grand word "dioxide." I was, however, entirely wrong; the student was in dead earnest and really wanted dioxide of manganese, and had been at four or five chemists who had all told him they did not stock it. It is just barely possible that none of these chemists stocked dioxide of manganese, but I rather think they must have mistaken it for one of those troublesome new remedies which most of us abhor.

To come back, however, to the central idea of my subject, namely, the advance of pharmacy, an advance in which, as I have already said, there is no finality, I must confess to the belief that we shall have a curriculum in the near future. There is not one of us who would not, I believe, wish his son to be a better man than his father, and with the same instinct there is not one here who would not wish his son following in his own calling to be a better pharmacist than himself. Practically, is this not from one side of the subject the whole question? We act upon it at the present moment in giving them the training necessary to make them efficient pharmacists, and the only difference would be that in establishing a curriculum their studies would be more thorough and less desultory than they are at the present moment. Of course a great many young men at present following pharmacy are not the sons of their fathers in the pharmaceutical sense, and thus far the establishment of a curriculum would entail hardship upon many who are struggling to solve the problem of efficiency *versus* necessity. What I affirm, however, is this: first that the past fifty years' history all point to and converge towards a curriculum; second, that practically all those who have the true interests of pharmacy at heart, such as the leaders of pharmacy, already act on the principle of a curriculum; third, that an established curriculum would concentrate and direct into a channel more purely pharmaceutic the education of those entering the profession, and hence be more efficient than that which in the majority of cases exists at the present time; and fourth, that an established curriculum would not in the end be more expensive to the great mass of students who come up for their examinations, nor entail more hardships upon them than they suffer at the present under the desultory and often forced studies which they are compelled to undergo. Nearly thirty years ago Dr. George Wilson, who probably was the first person outside our own profession to recognize and advocate the necessity for an educated pharmacist, said that several things were essential, but principally "a knowledge the greater the better." This is just the very point which I advocate. A knowledge the greater the better is still *the* essential, and this I assert can only be gained by a thorough and systematic course of training in one direction and for one specific end. With knowledge "personality" is enhanced and intensified, while the two combined will not fail to ensure success, however adverse the surrounding circumstances may be. It is not without a purpose, gentlemen, that I have taken up this line of thought to-night. In every direction we hear of pharmacy degenerating into a mere trade, all that is higher and progressive being stamped out of it in the keen competition at present existing. I have no sympathy whatever with this idea. On the contrary I believe that pharmacy will progress more and more, but if it is to progress, I believe equally confidently that it will be in the line which I have just indicated.

Mr. J. B. Stephenson, in moving a hearty vote of thanks to the Chairman for his address, said he was sure they would all be gratified to see Mr. Gilmour in such a position, and would willingly promise him their support. They would do this the more because, owing to the retirement of Mr. Baildon, and the impracticability of Mr. Watt taking the office of Chairman, Mr. Gilmour had been called upon rather unexpectedly, and had, at some self-sacrifice, stepped into the breach. An additional strain had been put upon him in having to prepare an address at short notice, owing to the impossibility of securing, from circumstances beyond their control, a gentleman to give them an address such as that of Professor Crum Brown last year. He felt that the address they had just listened to had served the purpose admirably. He took it that the great qualification in such an address was that it should strike a high keynote which might give a tone to all the work of the session, and he thought there could be no doubt that in that respect the address had succeeded. The Chairman had invited discussion, but he thought it would be altogether unusual to controvert or criticise the views expressed in an inaugural address. That would be contrary to the academic spirit in which it was customary to receive all such addresses, and though he could not say that on all points he was at one with the views expressed, he felt that for the present they must agree to differ. Whatever their individual opinions might be on the topics touched upon in the address, he felt sure they would all heartily join in the vote of thanks he now proposed.

The vote of thanks was awarded with acclamation, and the Chairman, having expressed his thanks, called upon Mr. C. A. Macpherson to read the following note on:—

Liquor Strychninæ Hydrochloratis and other Official one per cent. Liquors.

BY C. A. MACPHERSON.

It is evident that there is some uncertainty regarding the strength of some of the more active preparations of the British Pharmacopœia, and also some mental confusion as to the exact meaning and intention of the formulæ given for these. Proof of this was recently given in the *Chemist and Druggist*, where a correspondence, which failed to clear up the point at issue, was carried on concerning liquor strychninæ hydrochloratis, and in connection with which a letter from Dr. Attfield was published. In that letter, which was in reply to an effort to obtain an authoritative opinion on the subject, he says, "that the expectation that the 'parts' in the British Pharmacopœia should always be in strict mathematical accord with the more concrete quantities is not justified by official statements;" that "the impression that" he has "publicly said that "parts are not placed in the Pharmacopœia for manu-

facturing purposes is a most erroneous impression," and he "is not aware that any authority on the matter has ever said anything of the kind." Again, that "if in connection with the weights and measures of the British Pharmacopœia correspondents would with the minimum of argument and speculation state whether they do or do not find the use of 'parts' to be convenient and advantageous, they would materially aid future compilers of the Pharmacopœia in deciding what is best for pharmacy and pharmacists in this direction, most useful to medical practitioners, and most conducive to the safety of the public."

Here then although there is no direct statement, an indirect admission is made from which it may be inferred that the intention of the compilers of the Pharmacopœia in introducing the proportional parts method into some of the processes was that it might be made use of for manufacturing purposes, if desired. This being so, the question arises: is there any valid reason why the "parts" should not be stated in more strict mathematical accord with the concrete quantities than they are in cases where this could easily have been done, without introducing any difficulty as to their employment in practice? Another question also suggests itself in connection with this subject: what would be the value of a statement as to the utility or inutility of the "parts" method unless the facts upon which the opinion was based were also stated and the reasons adduced for arriving at the conclusion? This question is all the more pertinent when it is remembered that there is considerable haziness as to what the Pharmacopœia in some instances intends, due in some measure to a want of definition which is all the more remarkable when compared with the minuteness of description employed in other cases.

That these questions are worthy of a little consideration and that the processes for some of the more potent preparations are in need of revision can easily be shown. For instance, in the correspondence alluded to, one of the writers gave the following excerpt from his laboratory book:—

Liquor Strychninæ Hydroch.

Strychninæ	480 grains.
Acid. mur. dil.	℥ij.
Sp. vini rect.	℥xxiv.
Aq. distil.	ad ℥ 100.

Here evidently was a gentleman who followed the process according to his light. Finding it stated that the strength of the solution was "about 1 in 100," and that the parts set down, when added together, amounted to 100, he assumed that the same number of ounces of the different ingredients would produce 100 fluid ounces of solution, and to save trouble constructed a formula for himself and wrought therefrom. The result of this was that he had a solution which differed entirely from what it should have been, and was much stronger than authorized by the Pharmacopœia. Yet doubtless he believed he was right, and was of the opinion that the "parts" method was highly convenient and advantageous. For his error in using the troy weight there is no blame attachable to the Pharmacopœia; but even when the official process is strictly followed, a solution prepared according to the parts method differs from one made according to the alternative formula in containing a very much larger quantity of acid, and a smaller quantity of spirit. This fact may account for the alleged deposition of crystals of strychnine hydrochlorate from the official liquor in cold weather.

This difference in composition would have been avoided if the "parts" had been stated with a nearer approach to strict mathematical accord with the concrete quantities, and it would be interesting to know why this has not been done in this and similar cases of powerful preparations, while it has been done in others of lesser moment, where it entails a greater practical difficulty in manipulation.

That there would have been no insuperable difficulty met with if this had been done will be seen on comparing the actual relative proportions with those set down in the Pharmacopœia.

Liquor Strychninæ Hydrochloratis.

	B.P. "Parts."	Actual "Parts."
Strychnine	1 part	1 part
Diluted hydrochloric acid	2 fl. parts	1·4 fl. parts
Rectified spirit	24 ,,	24·3 ,,
Distilled water	73 ,,	72·9 ,,

Any difficulty in measuring the fluid parts which there may seem to be here is more apparent than real. For while there would be some difficulty in getting the fractional part of a fluid grain, there could be none in obtaining that of a fluid drachm, ounce or other liquid part, seeing that the fluid drachm and ounce are divided into sixty, and four hundred and eighty parts respectively.

In a footnote the strength of the liquor is given as "about 1 in 100," while under "Strychnina" it is said to be "1 grain in 100 fluid grains." This convenient little word "about" seems to have about as elastic an interpretation in the Pharmacopœia as in legal procedure, where it is said to mean any time within a month before or after a specified date.

In order to ascertain the value of "about" in the case under consideration, and to check the statements as to the strength of the solution, the volume of liquid produced by using the official concrete quantities requires to be known. By calculation—allowing for the condensation which takes place—this should be 2 fluid ounces and 8 fluid grains (883 fluid grains), and in practice, care being taken while dissolving the alkaloid to limit the loss by evaporation, as far as possible, is found to be 2 fluid ounces (875 fluid grains). Dividing these volumes by the weight of the contained alkaloid the strength of the solution is found to be, by theory, 1 grain in 98·1 fluid grains, and in practice 1 in 97·2. In order to test these results a practical examination of the liquid was made. From two determinations the density was found to be 0·978 at 60° F. Two estimations of the proportion of alkaloid in the solution were also made. In each case 100 grain measures weighing 97·8 grains were evaporated to dryness at 100° C., and the heat ultimately raised to 120° C., and the residues weighed.

The residue is strychnine hydrochlorate—

$$(C_{21}H_{22}N_2O_2HCl = 370{\cdot}5),$$

every 370·5 parts of which are equal to 334 of alkaloid.

The first residue weighed 1·2 grains = 1·082 grains alkaloid.

The second residue weighed 1·18 grains = 1·064 grains alkaloid.

1·082 grains alkaloid in 100 gr. measures = 1 gr. in 92·4 gr. measures.

1·064 grains alkaloid in 100 gr. measures = 1 gr. in 94·0 gr. measures.

Mean = 1 gr. in 93·2 gr. measures.

It is just possible that these show somewhat more than the actual strength, since it is with some difficulty that the last portions of the water of hydration are removed. And as the presence of one molecule of water in the formula would raise the molecular weight of the strychnine hydrochlorate to 388·5, the first residue of 1·2 grains would thus represent a proportion of 1 gr. in 96·99 gr. measures, a proportion so near that obtained by dividing the bulk of the liquid by the weight of the contained alkaloid as to amount to a virtual corroboration of the result so obtained. Since these estimations were made it has been noted that a temperature of 130° C. is required to completely remove the two molecules of water of hydration in strychnine hydrochlorate, and this seems to confirm the surmise

that the above mentioned residues were not completely dehydrated.

From the foregoing it is seen that the liquor is appreciably stronger than it is said to be in the Pharmacopœia, and while still literally following the directions the strength might be yet further increased through greater evaporation during the making of the solution, without any check so far as the Pharmacopœia is concerned. This, however, is not likely to happen, as it is believed to be customary to make up the volume of the liquor when necessary, so that every 2 ounces shall contain 9 grains of alkaloid.

In this connection it may be profitable to glance at the rest of what may be called the one per cent. liquors, to see to what extent they agree with their reputed strength. These number eight in all, and with the exception of one contain powerful poisons. Two of them, liquor arsenicalis and liquor arsenici hydrochloricus, are described as containing 1 per cent. of active ingredient, other two, liquor morphinæ acetatis and liquor morphinæ hydrochloratis, are said in foot-notes to be "about 1 in 100," while three, liquor atropinæ sulphatis, liquor potassii permanganatis and liquor sodii arseniatis, are stated also in foot-notes to be "1 in 100," while under the headings of their active ingredients the last two are given as containing "4·5 grains in 1 fluid ounce," and all the others are described as "1 grain in 100 fluid grains." There have thus been adopted three different and differing ways of stating the strength of a class of preparations which it is presumed were intended to contain the same uniform proportion of active ingredient to solvent. The eighth one, liquor arsenii et hydrargyri iodidi, stands on a somewhat different footing, being described as containing "about 1 per cent. by weight" of each of its active constituents.

Let us now take these in detail and see how far they accord with these descriptions. Ten times the quantities for the morphine liquors are found to yield products measuring 20 fl. oz., 3½ fl. drs., or 8941·4 fl. grs., which, divided by the amount of morphine salt employed shows a proportion of 1 gr. in 99·38 fl. grs. Examined in the same way the arsenical liquors show a proportion of 1 gr. in 101·58 grs. by weight and 1 gr. in 100·57 by measure. For the atropine solution 902·3 fl. grs. of solvent are ordered for 9 grains of the salt, which gives 1 gr. *to* 100·2 fl. grs. or 1 *in* 101; for that of arseniate of sodium 875 fl. grs. are ordered for 9 grs. of solid, which is equal to 1 gr. *to* 97·2 or 1 *in* 98; while for the permanganate solution, the safest of all, 875 fl. grs. are ordered for 8·8 grs. of the salt, equal to 1 gr. *to* 99·4 or 1 *in* 100·4. The Donovan's solution has 1 gr. of each iodide in 98·8 grs. by weight, equal to 1 in 97·2 by measure. Tabulated these stand thus:—

	Gr. weight.		Gr. measures.
Liq. arsenicalis	1	in	100·57
Liq. arsenici hydrochloricus. .	1	,,	100·57
Liq. atropinæ sulphatis . . .	1	,,	101·
Liq. morphinæ acetatis . . .	1	,,	99·38
Liq. morphinæ hydrochloratis .	1	,,	99·38
Liq. potassii permanganatis. .	1	,,	100·4
Liq. sodii arseniatis.	1	,,	98·
Liq. strychninæ hydrochloratis.	1	,,	97·2
Liquor arsenii et hydrargyri iodidi	1 in 98·8 by weight or 1 ,, 97·2 ,, measure.		

It may perhaps be said that the solutions are near enough to their alleged strength for all practical purposes, and that all this is merely carping criticism. Such a defence, however, would be rather strange in these days of exact dosage, and particularly so when advanced on behalf of a work, published "by authority," which has laudably provided by an elaborate process for the standardizing of tinct. nucis vomicæ, a comparatively weak preparation. Surely when such provision has been made in that case it cannot be held to be unreasonable to have expected that as much care would also have been exercised in regard to far more active preparations which were capable of being exactly standardized with the greatest of ease.

That this could easily have been done is apparent, for had the proportion of 87·5 grains in 20 fluid ounces of solution been adopted, then solutions would have been obtained containing exactly 1 grain of active ingredient in 100 grain measures. By employing this general formula, which it is here proposed should now be done, the formula for liquor strychninæ hydrochloratis would stand thus:—

Strychnine . .	35 grains	or 1	part.
Diluted hydrochloric acid .	54 minims	or 1·4	fluid parts.
Rectified spirit .	2 fluid ounces	or 25·	,, ,,
Distilled water sufficient to produce . .	8 fluid ounces	or 100	,, ,,

The usual instructions for preparing would then follow, but amended so far as to direct that the finished liquor should measure 8 fluid ounces at 60° F. That such a formula besides being accurate would also be convenient is easy of proof, for it lends itself readily to manipulation, whether the concrete quantities or the proportional parts be followed. If the proportional parts be taken it is immaterial whether the quantities required are minims, fluid drachms, ounces, pounds or gallons, so long as it is borne in mind that 109·7, or in round numbers, 110 minims, are equal to 100 fluid grains, and that the eighth part of an ounce weighs 54·7 grains.* For instance, suppose that it is desired to convert 1 grain of strychnine into solution, the quantities required would be strychnine 1 grain, acid 1½ minims, spirit 27½ minims, and water to make 110 minims; or suppose 10 fluid drachms of liquor were wanted the quantities would be 5½ grains, 8½ minims, 2½ fluid drachms and 10 drachms respectively.

The arsenical solutions prepared in accordance with the proposed general formula would, while being of the strength of 1 gr. in 100 fluid grs. like the other solutions, contain 1 gr. in 101 by weight, and Donovan's solution, by likewise being made of the strength of 1 gr. of each iodide in 100 fl. grs., and so brought into line with its allied preparations, would have 1 gr. of each iodide in 101·6 by weight, and would be nearer in strength to the original preparation known by this name than the present official one is.

Were the above suggestion adopted the indefiniteness which at present surrounds these pharmacopœial preparations would be removed, and a condition of affairs exist which would undoubtedly prove serviceable to pharmacists, be no drawback to medical practitioners, and certainly be conducive to the safety of the public.

Mr. Nesbit, Portobello, said he was sure they all felt that this note of Mr. Macpherson must have involved a large amount of work. He thought, however, that those who criticized this part of the Pharmacopœia must remember that the present state of things was really of the nature of a compromise between the old system and the new, and therefore the figures for the parts were not in all cases absolutely correct. The suggested formula given by Mr. Macpherson was for 8 ounces, but the official formula was only for two. In the former case it was perhaps not difficult to adjust the parts with greater accuracy, but it was not so easy with the smaller quantity. Why the Pharmacopœia authorities had given a formula for so small a quantity he did not know, as he thought it would rarely happen in practice to make only 2 ounces at a time.

* By keeping these proportions in mind medical practitioners would also be able to calculate without difficulty exactly what proportion of active ingredient was present in any number of minims prescribed.

Mr. Stephenson said he thought the real reason of these discrepancies was that in the Pharmacopœia they had two denominations, the apothecaries' and the avoirdupois, and these could not be readily adjusted. So long as this anomalous state of matters continued it seemed to him almost nonsensical to strain after mathematical accuracy. The real solution of the difficulty lay in the adoption of the metrical system. He remembered that many years ago, when the British Pharmacopœia was first issued, Dr. Charles Wilson strongly recommended that the apothecaries' weight should be discarded altogether, but it was not done. At the same time it was quite possible that these official formulæ were not so perfect as they might be, and he thought they might very well have kept them at a uniform strength of 4½ grains to the ounce. Mr. Macpherson's note was highly creditable, and must have cost him a lot of very careful calculation.

Mr. Hill said he thought the real point of the paper seemed to be that it would have been as easy to make the liquor strychninæ 1 in 100 as 1 in 97·2, and that this ought to have been done.

The Chairman said there was no doubt some of the official figures were not exact, and in a work like the Pharmacopœia they naturally expected that everything would be as near perfection as possible.

Mr. Macpherson in reply to Mr. Stephenson said he thought there should be no difficulty with grains and liquid measure, if it was borne in mind that 100 grains equalled 110 minims, and that 54·7 grains was the eighth part of a fluid ounce.

The Chairman then called upon Mr. George Lunan to read the following:—

Note on Syrupus Ferri Hypophosphitis, B.P.C.

BY GEORGE LUNAN.

The point in this note has been already generally, if not so specifically brought forward, with some general notes on the new B.P.C. formulary at the meeting held here a week ago.

Syrupus ferri hypophosphitis is prepared, by the revised formula, by mixing one volume of the concentrated solution with four volumes of simple syrup. The former is directed to be kept in bottles quite full and in a dark place, this being of course to prevent oxidation. It also contains, besides the salt, a small quantity of hypophosphorous acid, also no doubt for preservation.

In preparing a sample of the syrup about three weeks ago from this solution made immediately after the publication of the formula, I found that almost immediately the ingredients were mixed a glairy opacity was developed that subsequently separated as a well-defined precipitate, consisting no doubt of ferric hypophosphite, for the addition of ·3 per cent. of hypophosphorous acid has been found to redissolve this precipitate and to preserve solution.

There are samples of this batch with and without acid on the table, and the comparison brings out the point. In order to confirm this result, it was repeated with two separate samples of syrup, and from another unopened bottle of the concentrated liquor. The previous conclusion has been fully justified, as these additional trials have shown exactly similar results.

Whether kept in full or partly emptied bottles the addition of this small quantity of hypophosphorous acid (100 minims of 30 per cent. to pint) has been most beneficial, and the keeping properties, as far as these samples indicate, permanently improved.

Looking at the formula for liquor ferri hypophosphitis conc. we find that the amount of diluted sulphuric acid in it, if entirely decomposed by baric hypophosphite, would yield 20½ grains of hypophosphorous acid, equal to ·22 per cent., and as far as my experience goes this is sufficient to preserve the solution. As soon, however, as this is increased by syrup to five times its volume, and the percentage consequently reduced to ·044 of preservative, it becomes too small to effect its object, and the oxidation begins. Now the quantity which I have found sufficient to preserve the syrup is only ·3 per cent. in addition to the ·044 from the solution, altogether equal to about ⅓ per cent. or ⅕ of a grain in a teaspoonful.

Surely then when we use this reducing agent for preserving so many ferrous solutions, there is no objection, where it is the acidulous radical in use, to using it in sufficient quantity to be effectual.

Of course if the compound syrup to be prepared must be "neutral or slightly alkaline," there would be an objection, but the preparation of a genuine syrup need not by any means be subjected to such a dictum.

In passing I should note that the syrupus hypophosphitum compositus, as made by the revised formula, contains twice the quantity of acid which the previous one did, and that it is made directly from the concentrated solution, this being an advantage from the dissociation of the two formulæ.

In the formula for the concentrated solution of ferrous hypophosphite the quantities are calculated for baric hypophosphite ($Ba2\,PH_2O_2,H_2O$) being 98 per cent. pure, and it is therefore rather misleading for the Committee to define it as "containing not less than 95 per cent.," for the natural conclusion made from this would be, that the quantity was calculated from that standard and not higher.

With these small exceptions I believe both the formulæ to which I have referred to work very well, and I do not think the one to which this note specially has reference could be improved, by having the quantities of barium and sulphuric acid so increased in the concentrated solution, as to give sufficient acid for preserving when made into syrup, but rather, as I have indicated, by adding the acid on mixing, and in keeping the two separate as long as practical, another advantage which the two revised formulæ give over the old one.

Mr. Gibson said that, like Blaud's pills, the hypophosphites had been considerably thrashed out during recent years, and though they had presented many hard nuts to crack, he had no doubt that as time went on the difficulties would be overcome. Last year's formula was faulty from the presence of calcic sulphate in the solution, which of course was precipitated on the addition of the sugar. The new process had been well calculated with a view to having the smallest possible quantity of sulphuric acid present, and just sufficient hypophosphorous acid to keep the ferrous hypophosphite in solution. The liquor ought to be comparatively free from sulphuric acid if kept for a reasonable length of time, so as to allow the whole of the barium sulphate to precipitate. He would like to ask how long Mr. Lunan kept his solution before using it. One point that demanded careful attention was that the materials used must be fully up to the standard. Weak barium hypophosphite, for instance, would lead to presence of sulphuric acid in the liquor, and this might cause precipitation by oxidizing the hypophosphite. That might account for the precipitate in the samples shown. On the whole he was surprised to find that the formula had turned out as it had done. He did not think a satisfactory liquor ferri hypophosphitis would ever be obtained until the suggestion made by him (Mr. Gibson) a few years ago was adopted, viz., dissolving the metal in hypophosphorous acid. A liquor so prepared remained permanent for an indefinite length of time.

Dr. Clark said he was also surprised at this formula having turned out as it did, and he thought Mr. Gibson's suggestion as to the barium hypophosphite possibly explained why it had not kept well. It was a distinct advantage to all of them to know that by

the addition of a small percentage of hypophosphorous acid a perfectly clear and satisfactory syrup could be obtained.

Mr. Arthur asked if Mr. Lunan had worked with the popular American hypophosphite syrup, and if he could say what the precipitate in it was, and whether an excess of hypophosphorous acid would prevent it.

Mr. Hill said he noticed from the samples shown that the precipitate was greater in the half-filled bottle than in the full one. This seemed to indicate that oxidation had something to do with it. He was also informed that if the freshly-prepared liquor is mixed with syrup no precipitation takes place, but that if it has been kept any time, especially in bottles not quite full, a precipitate forms immediately on mixing it with syrup. This also pointed to oxidation as the cause.

Mr. Nesbit said he had observed a similar precipitation in the case of the ordinary phosphate syrups. For a number of years he had been accustomed to make these from liquors, and he had observed that a freshly made liquor when mixed with syrup gave a clear syrup, while the same liquor, after being kept for some time, gave a slight precipitate when added to syrup. This he attributed to oxidation, and the consequent presence of perphosphate in the liquor.

Mr. Lunan, in reply, said he had tested the liquor for both sulphuric acid and barium, but found neither present. The official formula was calculated for 98 per cent. barium hypophosphite, and that he found to correspond with the material he used. Even had there been excess of sulphuric acid he did not think it would have oxidized the ferrous hypophosphite. He thought it was impossible to preserve a solution of ferrous hypophosphite without the presence of a powerful reducing agent, such as hypophosphorous acid, and the quantity provided for in the Formulary was barely sufficient. It was true that if a fresh liquor was mixed with syrup there was no immediate precipitation, but it would begin to form within one day. He had not noted that the process of dissolving the metal in acid was suggested originally by Mr. Gibson. It had been resuggested within the last year by Mr. Eversou, but he was inclined to agree with the remark made by Mr. Lawson in a paper read here last year, viz., that, in view of the brevity of human life, it was impracticable. As to the length of time he had kept the solution before using it, he had waited until the barium sulphate was entirely precipitated. He had not experimented with the American syrup referred to by Mr. Arthur, but it was important to remember that the iron was present as sodio-citro-pyrophosphate and that made possible the fact that the syrup was slightly alkaline. The precipitate probably consisted of hydrate of manganese. The syrup also contained a trace of sulphuric acid, which might be reduced to sulphuretted hydrogen, and in this way cause precipitation of the manganese. He thought the suggestion of Mr. Hill as to oxidation accounted for the precipitation, and this view was confirmed by the remarks of Mr. Nesbit.

On the motion of the Chairman a hearty vote of thanks was unanimously awarded to the authors of the papers.

Attention was then directed to the following donations to the Museum:—

Specimen of commercial salep.

From Dr. AITCHISON, C.I.E., F.R.S., Brigade-Surgeon, Bengal Army.

Specimens of American drugs, etc.

From the MUSEUM, 17, Bloomsbury Square.

With reference to the latter and some other specimens the Assistant-Secretary explained that he had not been able to lay them all out, but hoped to show them at next meeting.

Mr. J. B. Stephenson moved a vote of thanks to the donors, which was awarded with acclamation.

The meeting then closed.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, November 15, Mr. W. Crookes, F.R.S., President, in the Chair. A number of certificates were read for the first time, and several gentlemen were duly elected Fellows of the Society.

The following papers were then read:—

The Principles of Thermochemistry. By S. U. PICKERING.—The author rejects the thermochemical principles enunciated by Thomsen, Naumann and Berthelot, not only on special grounds, but on the more general ground that they depend on an impossible distinction between chemical and physical actions. A satisfactory explanation of all known thermochemical facts is derived from the recognition of the laws of dissociation and the hydrate theory of dissolution. Every act of combination must be accompanied by the evolution of heat, and in interactions where heat is absorbed this absorption must be due to the fact that one or more of the agents being partially dissociated at the temperature of the interaction, the removal of one of the products of the dissociation necessitates a further decomposition of the agent. The heat evolved must also be a direct measure of the affinities saturated, and of two possible interactions that which evolves more heat must occur to the exclusion of the other. The cases of endothermic changes which present difficulties are those in which liquids and solids are concerned. The heat absorbed when many solids are dissolved in liquids cannot be explained by the fusion, but only by the volatilization of the solid. A mass of water contains some fundamental molecules possessing an energy of 10,000 cal. greater than the average molecular aggregates constituting the mass. These can therefore combine with the salt, and effect its volatilization with an evolution of heat, even if the heat of volatilization be nearly 10,000 cal.; other water aggregates then dissociate to supply the place of the free molecules thus removed from the sphere of action. From theoretical considerations the author arrives at the conclusion that Berthollet's theory as to the division of a base between two acids is correct—that two acids present in equivalent proportions should divide the base equally between them; that, since sulphuric acid acts as a monacid in this respect, H_2SO_4 should be compared with HCl and not with $2HCl$; and that, if one of the two acids forms a dissociable salt, it would take none or very nearly none of the base. The facts observed, the author argues, are in accordance with these conclusions, and are entirely opposed to the existence of the so-called "avidity" or "affinity" constants advocated by Ostwald and others. The reason why sulphuric acid acts as a monacid in this respect, or, in other words, why H_2SO_4 and K_2SO_4 interact to form $2HKSO_4$ in spite of the absorption of heat accompanying the action, is that lower hydrates (especially of the acid, are present), and that with these lower hydrates the interaction is exothermic, and, therefore, necessarily occurs, the absorption of heat noticed being due to the dissociation of the higher hydrates to supply the place of the lower ones thus removed from the sphere of action.

Professor Ramsay said that it was merely a matter of nomenclature to distinguish physical attraction, in which each molecule present attracted every other molecule according to some law comparable with the law of gravitation, from chemical attraction, in which selective attraction is exercised; but that he preferred to draw the distinction, where possible, in order to save confusion, though it might be difficult in some cases to do so. He did not believe in the universal presence of complex molecules in liquids and solids; nor did he exclude the existence of such. The researches of Pro-

fessor Young and himself, he thought, conclusively established the absence of a complex molecular structure in such liquids as ethyl alcohol and ether; while on the other hand Henry's arguments testified to the complexity of the molecules of certain oxides such as silica. And with regard to water, which especially formed the subject of Mr. Pickering's remarks, while the vapour density pointed to molecular simplicity, other arguments drawn from its behaviour when examined by Raoult's method were in favour of moderate molecular complexity.

Dr. Armstrong said that he agreed with Mr. Pickering, and thought that it would be necessary in the future to attach a far wider significance to the term chemical action, and to greatly restrict the use of the term physical action—that, in fact, very many so-called physical changes would be found to involve a change in molecular composition or configuration. It was conceivable that in certain cases such as Professor Ramsay had mentioned molecule acted upon molecule chemically, but in such manner that the molecular aggregate was of the dimensions of the mass. By taking into account the action of water, Mr. Pickering had advanced what appeared to be a rational explanation of many facts which hitherto had appeared paradoxical.

Mr. Pickering, in reply to Professor Ramsay, said that the fact that gaseous water was of normal density appeared to him compatible with the existence of complex water molecules; probably a sudden change attended liquefaction or gasification. This argument might be of general application.

Note on the Mixture of Propyl Alcohol and Water. By Professor RAMSAY, F.R.S., and Professor YOUNG.—Chancel has called attention to the fact that a mixture of propyl alcohol and water in the proportions $C_3H_8O : H_2O$ distils over to the last drop at 87·5° (press. = 738 mm.). Konowalow, however, determined the vapour pressure of mixtures of the alcohol and water and arrived at results adverse to the conclusion that a definite hydrate exists, and the authors are of similar opinion. They found that the vapour-pressures of the mixture determined by the statical method were uniformly higher than those determined by the dynamical, but the difference is very small and far less than is observed with most dissociating substances, the behaviour being more nearly that of an imperfectly purified stable substance. The results of vapour-density determinations seemed to point to a rise of density with fall of temperature and increase of pressure, but it was afterwards found that the greater part of the rise was due to condensation, probably of water, on the side of the tube. A percentage contraction of 1·85 was observed on mixing the alcohol with water—71·46 p. c. alcohol to 28·54 p. c. water. The composition was found of the mixture of constant boiling point to vary with the pressure under which it was distilled.

Mr. Howard expressed the opinion that propyl alcohol and water formed a definite compound until vapourized; the behaviour of the various lower alcohols with water, and the fact that the solubility of amyl alcohol in water diminished as the temperature rose, all tended to prove that the alcohols formed hydrates.

Professor Young, in support of his opinion that the mixture was not a hydrate, recapitulated the arguments which he and Professor Ramsay had advanced in previous papers in discussing the properties of various liquids and liquid mixtures.

Note on the Action of Nitric Acid on Ammonium Chloride. By F. G. MATTHEWS, Ph.D.—The principal gaseous product of the action of nitric acid on ammonium chloride in solution is nitrous oxide, and not nitrogen, as has been previously stated; the gas is mixed with small quantities of chlorine and oxychloride of nitrogen, from which it may be freed by washing with sodium hydroxide. The nitrogen of the nitric acid as well as of the ammonium chloride is concerned in the formation of the nitrous oxide. The interaction is of general application, and takes place in all cases in which a solution of an ammonium salt is heated in the presence of nitric acid and hydrogen chloride.

Ethylic Cinnamyldicthacctatc. By F. G. MATTHEWS, Ph.D.—A simpler method of preparing ethylic cinnamyldiethacetate than has been previously known is to allow a mixture in molecular proportions of benzaldehyde and ethylic diethacetoacetate saturated with hydrogen chloride to stand for about a month; the product separates slowly in crystals which are practically pure ethylic cinnamyldiethacetate. On hydrolysis with barium hydrate, cinnamic and diethacetic acids are produced, small quantities of a ketone only being formed. An attempt to prepare the corresponding monethyl-derivative in a similar manner failed. On trying to prepare similar derivatives of ethylic mono- and di-methacetoacetate no products could be isolated; the action appearing to be more complex than in the case of the corresponding ethyl compounds.

The Isomeric Sulphonic Acids of β-Naphthylamine. By ARTHUR G. GREEN.

The Constitution of the Dichloronaphthalenes, especially the αβ-Compounds. By HENRY E. ARMSTRONG and W. P. WYNNE.

Piazine-derivatives. By Dr. ARTHUR T. MASON.—In this paper the author adopts Widman's nomenclature, the "Ketines," "Pyrazines," "Aldines," and all compounds containing a ring of four carbon atoms and two nitrogen-atoms in para-position are now called "*Paradiazines*," or shorter, "*Piazines*."

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, November 22, the President, Professor Attfield, F.R.S., in the chair.

The following officers were elected for the ensuing session:—Vice-Presidents, Messrs. W. L. Williams and F. Browne; Secretary and Treasurer, Mr. F. W. Short; Assistant Secretary, Mr. E. White; Members of Executive Committee, Messrs. L. Ough, J. G. Shirton, T. Woodruff, and C. B. Bell.

An Introductory Address was then delivered by Professor Dunstan.

Professor Dunstan commenced by pointing out the various duties which would in all probability have to be performed by the future pharmacist, if pharmacy was to continue to exist as a distinct profession. These duties involved, above all things, an advanced knowledge of the science of chemistry, since, judging from the recent progress of pharmacology, it was in the highest degree probable that therapeutics would employ, more and more largely, substances of definite chemical constitution, most of them products of organic chemistry. It was incumbent on the pharmacist to possess such a knowledge of chemistry as would enable him from time to time to familiarize himself with the methods of preparation and modes of decomposition of these substances. It was pointed out that pharmacists would have to be something more than mere "analysts" or experts in the use of the apparatus to be found in the pharmaceutical laboratory. The Professor then proceeded to comment on some of the difficulties which at present lie in the student's path. He alluded with dissatisfaction to the tendency to shorten the time which is devoted to practical chemistry, a tendency which was mainly due to the large number of subjects which are now crowded into the single year which is generally given to study. For this overcrowding there appeared to be only one remedy, namely, a remodelled system of apprenticeship of such a kind as would constitute a true technical education for the pharmacist. Under a scheme of this kind it ought to

be possible for a student to acquire nearly, if not all, the knowledge necessary for passing the qualifying examination at the end of the period of three years. A year would then be left for the advanced study of chemistry and other subjects. At present chemistry, botany, materia medica, pharmacy and dispensing, were not unfrequently crowded into one year, the student having acquired, in the majority of instances, little or no knowledge of most of these subjects before his entry into the School of Pharmacy. The Professor, alluding to those who wished to take part in the advancement of pharmacy, laid great stress on the necessity of obtaining a training in accurate chemical work, and he quoted some recent remarks of Dr. Tilden's on this subject. Finally he alluded to the great advantages offered, through the far-sighted liberality of the Pharmaceutical Society, by the newly-instituted Research Laboratory. If pharmacy is to be considered as an integral part of medicine, then it must, like other integral parts, such as physiology and pathology, contribute, through pharmacology, to the advancement of medicine. It was to be expected that men able and willing to help in this work would be largely those who were, or had been, members of the Association.

At the conclusion of the address a vote of thanks to Professor Dunstan was proposed by the Chairman, seconded by Mr. Ransom, endorsed by Professor Green and Mr. Millard, President of the Chemists' Assistants' Association, and carried unanimously.

Mr. Wyatt having conveyed the thanks of the meeting to the President, it was then adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held at 103, Great Russell Street, on Thursday, November 22, Mr. E. J. Millard, President, in the chair.

The minutes of the previous meeting having been read and confirmed, the evening was devoted to the reading of short papers and notes by members.

The first communication read was a—

Note on an Improved Form of Pessary Mould.

BY A. WYBRANT.

This paper will be published, with illustrations, in an early number.

The next paper read was—

Notes on the Preparation of Drug Sections for Microscopical Examination.

BY F. ASHLEY ROGERS,

Pharmaceutical Chemist.

It is to be regretted that the great majority of pharmaceutical students of botany and materia medica, do not prepare their own specimens for the microscope, but rely upon the professional microscopist, who is not always a botanist, and has been known to supply the aerial stem labelled root.

It would certainly be much more satisfactory in every respect if pharmaceutical students prepared their own objects in the microscopical study of materia medica and structural botany, and I trust that these notes will show the simplicity of the operations and their inexpensive nature.

We may occasionally wish to prepare sections of fresh vegetable tissue. These cannot be cut until they have previously been hardened, which is accomplished by soaking for a week or ten days in pure methylated spirit, which should be frequently changed, say every twenty-four hours, until no colour comes away from the tissues. They can now be preserved in spirit, and are always ready for making sections.

But more frequently our drugs are obtained dry, and very hard; they must then be softened by soaking in water with a little methylated spirit, or even soaking in hot water, or in a 3 per cent. solution of potash (where it can be safely done), that is in cases in which the cell contents, being injured, unfit the section for examination. Sections of soft stems, ovaries, etc., may be made by hand. Take the specimen between the thumb and fore-finger of the left hand, hold the finger horizontally so that its upper surface may form a table, on which the blade of the razor may slide, keep the handle of the razor in a line with the blade, and draw it from heel to tip through the specimen and towards yourself; keep the blade well wetted with very dilute spirit, and float off the sections as they are cut into a saucer of water.

The drug specimen is however frequently too hard for section cutting, by hand; it is then necessary to use a microtome. A very good one is that invented by Mr. Stirling. This is simply a brass well, into which fits a very finely cut screw. The instrument having been firmly fixed to a table by means of another screw, the specimen is imbedded in a piece of carrot, or a mixture of lard and hard paraffin; the whole is put into the well, and as the screw is turned and gradually pushes out the whole of the contents of the well, sections are made with a razor or a section knife, which is nothing more than a large razor without a handle.

The knife and specimen should be kept well wetted with dilute spirit, and the sections may be kept until wanted in slightly diluted spirit. It is not necessary to use rectified spirit in section preparing, but the methylated spirit must not contain any kind of gum. A rough and ready test of the fitness of the spirit is to pour it into water; it should not affect the brilliancy of the water in the slightest degree.

For very friable tissues a special treatment is required.

First soak drug in strong alcohol, then in ether.

Now prepare a solution of celloidin in equal parts of alcohol and ether, about the thickness of glycerine (reserve one-third of this solution). To one-third of this solution add its own bulk of alcohol and ether, in equal parts, and to the remaining one-third add twice its bulk of alcohol and ether in equal parts.

Take the tissue out of the ether, and put into the thinnest of the above three solutions, for a few hours, then transfer to the thicker one for three or four hours, and lastly to the thickest for a day; take out and dry in the air and place in spirit until quite hard and opaque. It can now be easily cut.

The sections will be much more easily examined if they are stained one or more colours, and if they are to be stained they must usually be first bleached. First wash out the spirit by placing in water and then bleach by soaking in liq. sodæ chlorinatæ, B.P., for from two to ten hours. When all the colour has disappeared from the sections wash them in water three or four times at least. They can now be kept in spirit until required. Judson's dyes were at one time used for staining these sections; but now specially prepared stains are more generally used, which can be bought, or made, if more than a very small quantity is required. For excellent recipes for such stains consult Bower and Vines 'Practical Botany.'

The spirit should first be washed out of the specimen. It should then be immersed in the staining fluid for from three to ten minutes, and washed in spirit for from ten to fifteen minutes. Lastly, the section, which now presents a dull appearance, is cleared by placing on some clove oil until it sinks (usually in about five minutes); it will then be found to be quite clear, and is ready for mounting in Canada balsam, or more conveniently a mixture of Canada balsam and one-fifth its bulk of pure turpentine.

The brightness of a section stained with borax carmine is increased by placing in a mixture of spirit and one-sixth its bulk of hydrochloric acid for a minute

or so. The acid must afterwards, of course, be thoroughly washed out.

If a section is overstained it may be remedied by placing in a dilute spirituous solution of hydrochloric acid or dilute aqueous solution of acetic acid according to the stain used.

Double staining is accomplished by using alkaline and acid solutions respectively; for example, green and red by first placing in an acid green solution, washing with water, and then placing in borax carmine solution, then wash in spirit and clear in clove oil.

Clove oil is a very good clearing medium and a very good vehicle in which to preserve the sections until required for mounting, if it is intended to mount them in Canada balsam. If a specimen is stained before it is sectionized it must, of course, be left in the stain hours, and perhaps days, instead of minutes; this is only done with soft tissues, such as ovaries, which should be gathered before they are quite ripe. Fresh stems should not be more than three years old as a general rule.

Sections must not be bleached where there are cystolites or any other cell-contents which the bleaching fluid would dissolve. Certain resinous drugs, such as pellitory, must not be mounted in Canada balsam, which would dissolve out the resin; in such cases glycerine jelly containing carbolic acid, arsenic, or some other preservative, should be used. This is best used, not with a rod, but filtered while hot, and liquid through cotton wool directly on to the slide. To keep glycerine in is a very difficult matter. Gold size, which is at least ten years' old and quite "tacky," or sticky, is a very good cement, but it should be touched over about every five years.

Certain black cements are very liable to run into the Canada balsam and spoil the sections.

In conclusion, I would reaffirm that it is cheaper to make than to buy a good collection of drug sections, especially as many are only obtainable on the continent.

The President, having invited discussion,

Mr. Bird said he should like to ask Mr. Rogers for details as to washing sections after staining. He had had occasion to make a section of tobacco leaf lately, and had found some little difficulty in obtaining a satisfactory result after staining; washing seemed to affect the stain. He should also like to know how Mr. Rogers got rid of the celloidin in the hardening process he had described.

Mr. Williams asked for information as to the staining and mounting of bacilli.

Mr. Stark said that he had found good results obtainable by using dilute nitric acid for softening, instead of potash, especially in making sections of wood cells. He considered a mixture of Canada balsam and chloroform much superior to turpentine and balsam.

Mr. Rogers, replying to Mr. Bird, said he had found no difficulty in washing after staining, and generally found water quite sufficient, followed by spirit, for a few minutes, and finally clearing in clove oil. This medium also answered well for clearing after the use of celloidin; he had not found celloidin to act injuriously on the substance. He had not had much experience in mounting bacilli, but the usual way was to stain the bacilli dark, and the medium light yellow, or to stain the bacilli violet and the medium some other colour; such bacilli as that of anthrax took the stain well. He had not tried dilute nitric acid for softening sections, but it seemed feasible. He had used turpentine and balsam for some time, but should try the chloroform and balsam recommended by Mr. Stark.

In the absence of the author the next paper was read by Mr. Bird.

Note on Spirit of Nitrous Ether.

BY E. H. FARR.

Pharmaceutical Chemist.

The subject of the present note is one on which a considerable number of papers have been written, and perhaps, therefore, an apology should be made on adding to the number; but as I trust the following may be of some use, to a few at least of your members, I must make that my excuse.

In the first place it is my intention to give the results of a few experiments bearing on the economical production of spirit of nitrous ether on the basis of the B.P. process of preparation.

In the B.P. description of process 14 fl. ozs. of distillate are collected and diluted with 2 pints of s.v.r., or sufficient to make a product that will liberate seven times its volume of NO when $KI + H_2SO_4$ are added. In preparing the spirit one cannot help noticing the strong smell of nitrous ether which escapes condensation, and it was thought advisable to obviate this, whilst at the same time there was a chance of increasing the yield.

In the first experiment a tube was fitted on to the end of the condenser whilst the other end passed into a receiver containing about half a pint of s.v.r., the tube dipping about an inch below the surface of the spirit. In this experiment working on 1½ pint of spirit of wine with the B.P. properties of copper and acids, the quantity of product obtained when diluted to B.P. strength (7 volumes NO) was 144 fl. ozs.

In the next experiment on the same quantities of spirit in retort and receiver the effect of a little pressure was tried. The receiver was fitted with a cork through which passed the tube attached to the condenser, whilst another tube was added, one end passing into the top of the receiver the other dipping about an inch below the surface of some mercury in a small bottle. On this occasion the product in B.P. spirit of nitre was 156 fl. ozs.

In the second experiment, the bubbles of gas passing through the mercury after a time had a strong smell of nitrous ether, so it was thought that a further improvement might be made; first, by increasing the quantity of spirit in the receiver from about ½ a pint to 1 pint; and secondly, by replacing the mercury by spirit which should dissolve any nitrous ether escaping from the first receiver. This plan was tried in the last experiment, which was conducted as follows. For the first part of the distillate, 1 pint of s.v.r. was placed in the receiver (giving a column about 3 inches above the exit of tube from condenser), and 6 ounces in the second receiver, the latter being changed once during the process. For the second part of the distillate, 6 ounces were placed in each receiver and no change made. The three portions of spirit used instead of the mercury, measured 18 fl. ozs., and liberated 3½ times its volume of NO. This was next mixed with the two portions of distillate, and the whole estimated. It was found to equal 185 fl. ozs. of 7 vol. sp. æth. nit. One word as to the retort used in the above experiments; it was purposely much larger than absolutely necessary, in order that it might condense some of the products of high boiling points. The result is that the spirit takes over less water and acid compounds, which would interfere with its keeping properties. Using a large retort, I find that the bulk of distillate, in fact, ⅘, passes over between 70 and 72. The highest degree reached by final portion being the 80th. (B.P., "commencing at 76·7, rising to 79·4, but not exceeding 82·2° C.")

(The cost per pound of the sp. æth. nit. was 2*s.* 5*d.*, as made by the above modification.)

The President said they were glad to hear from Mr. Farr, and especially to listen to such an admirably practical note as this. He thought the modification

of the process one of great value, but it might be further improved by surrounding the vessels into which the gas was passed by ice. Spirit of nitrous ether was a substance they all had much to do with, and he invited the members to discuss this paper fully.

Mr. Dymond said that Mr. Farr's note fully confirmed his own experiments. He had found that even a mixture of ice and salt, giving a temperature of -10, was insufficient to fully condense nitrous ether when passed into spirit. He had tried passing through a long series of wash bottles containing spirit, but even then the condensation was not always complete.

Mr. Stark was glad to find his own experience confirmed by Mr. Farr's as to the temperature at which the nitrous ether came over. He had always found that during the whole process the temperature rarely rose to 80° C., and no doubt the lower temperature it distilled over the less chance there was of loss. His attention had been called some time ago to the statement that oxalic acid, in large quantities, was present in the residue in distilling sp. æther. nit., and thus that oxalic ether might be present in the distillate. He should be glad if Mr. Bird could give him any information on this subject.

Mr. Bird, in reply, said that he had heard oxalic acid was present in the residue, but had not attempted to confirm that statement. He should like to point out that this was particularly an instance in which it paid chemists to make their own preparations. As Mr. Farr showed spirit of nitrous ether by this process cost 2*s.* 5*d.* a pound, whereas wholesale houses were charging for the B.P. preparation as much as 3*s.* 2*d.*

Mr. J. G. Tingle then read a paper on—

Fractional Formula and the Atomic Theory.

BY J. GRANTLEY TINGLE.

The recent reading of some chemical observations on tartar emetic has given rise to a certain amount of discussion as to the propriety of writing formulæ which apparently necessitate the conception of fractions of molecules. In the paper referred to a formula for the double tartrate of antimony and potassium was incidentally given as follows:—$SbOKC_4H_4O_6\frac{1}{2}H_2O$. The $\frac{1}{2}H_2O$ seems to have created a quite unexpected sensation, and it has been regarded in some quarters as unscientific and as inconsistent with the principles of the atomic theory. There are also apparently grounds for believing that such impressions very generally prevail, at least among pharmacists, and in pursuance of a suggestion made to me a few days since by our President I have prepared a few notes on the subject, which are designed to elucidate the reasoning upon which such a formula is constructed.

It may be well to make it quite clear at the commencement that the mode of indicating chemical composition cited is by no means new. Precisely similar expressions may be found in most of the modern text-books of chemistry. To mention only one recognized English work—'Watts's Dictionary,' 1863–88—several instances may be there found, among which is the formula of the very compound under present consideration. That such nomenclature was in use in this country twenty years ago is therefore beyond doubt, and, in answer to the possible objection that the work above named is out of date, and therefore inadmissible as a reference, it is sufficient to open the first volume just issued of the new edition. By turning over the pages at random, abundant evidence may be obtained that the representation of a fraction of the formula weight of water is still sanctioned and resorted to.

Almost every notable worker in the domain of organic chemistry has made use on occasion of such formulæ. To enumerate their names *seriatim* would occupy more time than is at my disposal and would be besides too severe a tax upon your patience. A cursory examination of a single text-book sufficed to furnish hundreds of such names, among which the following were selected as the best known:—Anderson, Barth, Clève, Demarçay ($\frac{1}{3}H_2O$)), Erlenmeyer, Fischer, Fittig, Geuther, Griess, Heintz (a salt of barium with $\frac{1}{4}H_2O$), Hübner, Liebermann, Maybery ($Ba2C_2H_3O_2.\frac{1}{2}H_2O$), V. Meyer, Mitscherlich, Naumann, Otto, Rammelsburg ($KHC_2O_4\frac{1}{2}H_2O$), Remsen and Day, Schäfer, Schulze, Tollens, Wanklyn, and Wislicenus. Enough has been said therefore to establish the premise that the employment of the formula $SbOC_4H_4O_6\frac{1}{2}H_2O$ is neither unprecedented nor without the support of the highest modern authorities.

We are led therefore to inquire, What is the justification for such an apparent departure from the time-honoured dogmas of the text-books of theoretical chemistry? The elementary student not unnaturally stands aghast in the presence of a formula which appears to countenance—nay, to insist upon—the consideration of such a heterodox concept as half an atom of oxygen, and points with indignant protest to the statement of his manual that "the molecule is the smallest particle of a compound or element that is capable of existence in the free state."

We must remember in the first place that the theory of chemistry does not claim to have reached finality; the atomic theory is a convenient and consistent reasoning hypothesis which enables us to explain, more or less luminously, certain phenomena otherwise obscure and unintelligible. But as absolute truth it is neither asserted nor accepted by the most advanced exponents of the science. All that it assumes must therefore be received with reservation, as liable at any time to modification or even to radical alteration. The enunciation even of the indivisibility of the atom is far from being universally adopted—(witness the recent address of the President of the Chemical Society); that it holds good in chemical metamorphoses, may be, as a general rule, admitted, but there are reasons for believing that the idea of the Ατομος will not always be tenable. What do we know then of molecular weights and formulæ? The answer at once rises in your minds that our information is based upon the hypothesis of Avogadro, "All gases or vapours, without exception, contain in the same volume the same number of ultimate particles or molecules." Certainly, "all gases or vapours;" but what of liquids and solids? There are at present no reliable means of determining the molecular weight of matter in the two latter conditions.

"No wide generalisation has yet been found which enables us to determine the relative masses of the reacting units of solid and liquid compounds from a knowledge of the physical constants of these compounds . . . . . We know very little of anything of the structure of gaseous molecules; and of the molecular phenomena of solids our accurate knowledge may be said to be almost nothing . . . . . It is at least very probable that if we carry over the conception of the molecule from gases to liquids and solids, we must be prepared to regard the mass of the molecule of a liquid or solid compound as considerably greater than that of the molecule of the same compound in the gaseous state" (M. M. Pattison Muir, "Atomic and Molecular Weights," Watts' Dictionary, 1888). The formula $FeSO_4$ is merely the simplest expression of the ratio of composition existent between the constituent elements of ferrous sulphate, and Fe_2Cl_6 (or according to recent investigations $FeCl_3$) only represents the molecule of ferric chloride in the state of vapour; we have no reliable evidence of the nature of the molecule of the solid body. H_2O again signifies the composition of the molecule of water *vapour*; it seems tolerably certain that liquid water is probably $(H_2O)_n$, while the molecule of solid water or ice can only be represented by some such arrangement as $(H_2O)_n{}^{-x}$.

It cannot be too deeply impressed upon the mind—graven as with a burin—that the formulæ of liquids and solids do not and cannot indicate the molecules; they are simply expressions of ratio composition, and in recognition of this fact it has been recently proposed to substitute the, in such cases misleading term, "molecular weight," by that of "formula weight."

Bearing these principles in mind we see that $SbOKC_4H_4O_6 \cdot \frac{1}{2}H_2O$ is not intended to represent the molecule of tartar emetic—a compound, the vapour density of which cannot be determined. It is designed simply to indicate the simplest proportions in which the elements which enter into its composition are united together. It is clear that nothing would be gained by doubling the formula in order to unite H_2O, which can no more be considered to represent the molecule of water or to be consistent with the atomic theory than is $\frac{1}{2}H_2O$. On the other hand, by writing $(SbOKC_4H_4O_6)_2H_2O$, the formula is unnecessarily complicated, and the quite erroneous impression is conveyed that we are conversant with the nature of the molecule of tartar emetic. To sum up then:—the use of formulæ in which fractions of the formula weight of water are included is (1) not new; (2) not opposed to modern and authoritative usage; and (3) in no way inimical to the principles of the atomic theory, because it is neither concerned with nor touched by them.

The President, having invited discussion,

Mr. Dymond said that, as a matter of fact, little or nothing was definitely known as to the molecular weight of most solid and liquid compounds. Moreover, many compounds, as they knew, exhibited different vapour densities at different temperatures. All they could do by the aid of formulæ was to simply express in the simplest form the constitution of the compound. In papers read before the Chemical Society they had long discarded the term molecular formula in favour of that of ratio formula and ratio weight. In reference to this subject he might mention as a curiosity a formula employed by an eminent modern chemist. It was—$K_2S_{5\cdot98}O_{5\cdot65}1\cdot41\,H_2O$.

Mr. Williams said he might instance, as a case in point as to the evidence of the divisibility of molecules, iodine, which gave a brown solution in ether and a violet one in carbon disulphide, a phenomenon generally ascribed to molecular change.

Mr. Tingle, replying, said that modern formulæ evidently were not to be regarded as final, for there was, for example, proof of the existence of such molecules as S_6, S_4, S, etc.

(*To be concluded.*)

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The eighth general meeting of the thirty-ninth Session was held on Thursday, November 22, at the Royal Institution. The minutes of the previous meeting were read and confirmed.

The President read a letter from the Privy Council acknowledging receipt of letter *re* carbolic acid.

Mr. Symes referred to action of the Council with reference to his motion at the Pharmaceutical Council.

Mr. Parkinson mentioned that a short time since he had noticed considerable heat, amounting almost to deflagration, developed by simply pouring some crystals of permanganate of potash (commercial) into a wide-mouthed bottle.

Mr. A. C. Abraham had recently seen an instance of the pure recrystallized salt actually deflagrating when rubbed by itself in a mortar, and had put the resulting semi-fused mass aside for further examination. He was unable to account for the reaction unless it was due to some impurity, probably accidentally introduced in the original crude product.

Mr. Conroy then read a note on—

Linimentum Opii Ammoniatum.

BY M. CONROY, F.C.S.

This liniment, according to the recent edition of the B.P.C. Formulary, is made by mixing together 6 fluid ounces each of soap liniment, compound camphor liniment and tincture of opium, and 1 fluid ounce each of liniment of belladonna and stronger solution of ammonia, with directions to "mix, and after standing a week, filter quickly;" while in the first edition of the Formulary the directions to the same formula were simply, "mix and filter." When made by this latter plan I have invariably noticed that a crystalline deposit takes place after a few days' rest, from which it would appear that the object of the instructions contained in the last edition of the Formulary is to allow this separation to take place before filtering. This crystalline deposit resembles morphine very much, and as 20 fluid ounces of the liniment contains 6 fluid ounces of tincture of opium, equivalent to 198 grains of powdered opium or to 19·8 grains of morphine, it seemed very probable, considering the presence of caustic ammonia, that morphine would crystallize out. With the object in view of determining the nature of the deposit, I sealed up a bottle last May, made to the directions of the old Formulary, by simply mixing and filtering right off, and did not open it until yesterday, This bottle contained 20 fluid ounces, and after syphoning off the clear liquor, the crystalline deposit was thrown into a small filter, drained, and freed from adhering liniment by washing with a little proof spirit. After drying at 212° Fahr. the weight was found to be only 2·1 grains, and I was somewhat surprised to find that the crystals were not morphine, nor did they even yield a trace of morphine to the usual delicate tests for that alkaloid. They were only very slightly soluble in water, and the solution gave a white precipitate with barium chloride insoluble in nitric acid. Heated to redness on platinum foil, a slight charring occurred, due probably to extractive matter, as the crystals were of a yellow colour, and a white ash remained, which was nearly all soluble in water. This solution gave the violet potassium flame test, and a little of the solution placed on a watch glass, with a drop of solution of platinic chloride, gave a small crop of crystals on standing a few hours. There were also very slight traces of calcium and of meconic acid. This result, I must confess, came to me as an agreeable surprise, for I have looked upon this liniment since its introduction as an incompatible mixture; but it is very evident from this that the solvent action of the alcoholic medium is quite sufficient to hold the morphine in solution. Although these results are of a negative character, they are well worth recording, as no doubt others have observed this crystalline deposit and have possibly come to the same conclusion as myself, and they also show that the Formulary Committee have been well advised in directing the liniment to stand a week before filtering.

After a short discussion a vote of thanks proposed by Dr. Symes, seconded by Mr. A. C. Abraham, was unanimously passed.

Mr. Conroy then gave a demonstration of his new test for cotton seed oil in lard, and after an interesting discussion and a vote of thanks, the proceedings terminated.

Obituary.

EDMUND HEADLAM GREENHOW, M.D., F.R.S.

We regret to have to record the sudden death on Thursday, the 22nd ult., of Dr. Edmund Headlam Greenhow, at the age of 73 years. Dr. Greenhow took the M.D. degree at Aberdeen University in 1852, and in 1859 became a Fellow of the Royal College of Physicians, filling the office of Censor in 1880–81. For some years he held the offices of Senior Physician and Lecturer on Practical Medicine in Middlesex Hospital, and at the time of his death he was Consulting Physician to that institution. In 1875 he delivered the Croonian Lecture, the subject being Addison's disease. Dr. Greenhow's connection with the Pharmaceutical Society commenced with his appointment, after the passing of the Pharmacy Act, as Visitor on behalf of the Privy Council to the Society's examinations. For nearly twenty years he discharged the delicate duties of this office in a manner that was at once consistent with his responsibility to the public and agreeable to the gentlemen upon whose performance of their duties as examiners he had to report. This was early recognized, and in 1878 he was elected an Honorary Member of the Pharmaceutical Society. Dr. Greenhow was buried on Monday last at Reigate.

Notice has also been received of the death of the following:—

On the 27th of October, Mr. George Lear, Chemist and Druggist, Walsall Road, Birchfields, Staff. Aged 83 years.

On the 12th of November, Mr. George Harvey, Chemist and Druggist, Kensington High Street, London. Aged 54 years.

On the 27th of November, Mr. Henry Charles Bennett, Chemist and Druggist, Levenshulme, Manchester. Aged 37 years.

Parliamentary and Law Proceedings.

HEAVY PENALTY FOR SELLING SPURIOUS OLIVE OIL.

At the Stipendiary's Police-court, held at Stoke-on-Trent on November 23, Mr. George Hulme, wholesale and retail chemist and druggist, Fenton, was charged at the instance of Mr. E. W. H. Knight, inspector under the Food and Drugs Act, with having sold as olive oil an article that was not of the nature, substance, and quality demanded by the purchaser.

In addressing the Bench, the inspector said that the exemplary penalties which had recently been inflicted in the district did not seem to have put a stop to the practice of selling oils which were not of the nature asked for by the purchaser. The public had a right to be protected, and for that protection it naturally looked to the dealer, whose duty it was to take some steps to ascertain that he was selling a pure article. Under the Act of Parliament, a dealer had two ways of protecting himself; either he could insist upon a warranty with all articles purchased, or he could submit a sample to the county analyst, who would give a certificate upon the payment of the small fee of 6*s*.

The Stipendiary said there was a third way; viz., by selling an article as a mixture, or by the vendor saying he would not guarantee it to be genuine.

The inspector agreed with that observation, but said the tradesmen in North Staffordshire did not seem to take the slightest trouble to protect themselves.

The evidence given in support of the charge showed that, on September 21, an assistant of the inspector's purchased at defendant's shop a flask of what appeared to be olive oil, for which the sum of 10*d*. was paid; but upon a sample being submitted to the county analyst (Mr. Jones, Wolverhampton), it was found to consist of cotton-seed oil and a trace of animal oil.

The inspector said that the fact of the oil being sold in a flask should, according to the custom of the trade, be a guarantee that it was genuine. Oil so sold was known as "sublime olive oil," and was used for table purposes.

Mr. R. W. Day, who appeared for the defendant, did not dispute the facts as stated, and said he could only plead ignorance on the part of his client, who purchased the oil from a London house at a fair price. It was bought by defendant as "sublime olive oil," and he had not the least notion that it was anything else. Since the present proceedings were commenced the wholesale London house had been communicated with, and in reply they stated that as the oil was purchased eighteen months ago it was not reasonable to expect them to be responsible. They also said that oil did not improve by keeping, and when exposed to the light it turned so rancid as to possibly deceive an analyst as to its purity.

The Stipendiary: But exposure to light would not change its nature from olive oil to cotton-seed oil.

Mr. Day said that was so. He thought the only course open to him was to submit to a penalty, and then sue the wholesale house for the amount.

The Stipendiary said he hoped that not only would the defendant sue the London firm, but that he would be successful in his action. The case was a bad one, and as the Act was passed entirely in the interest of the consumer, and not of the seller, a substantial penalty must be imposed. A fine of £10 and 18*s*. costs was inflicted.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

POISON REGULATIONS.

Sir,—It appears to me that, while the above subject is one which might profitably be discussed by societies of pharmacists, it is not by any means ripe for being put before the Council in the manner adopted by Dr. Symes at the last meeting. Had his motion been one merely to discuss the merits of the question, and with a view "to ascertain the opinion of the trade upon the matter," I would venture to say that the end would more readily have been gained, by omitting from the motion the words "the desirability of adopting and submitting to the Privy Council for approval."

The question is not sufficiently ripe for being treated in this way, and I fail to see how Dr. Symes expected to ascertain the opinion of the trade by so treating it.

Dr. Symes says, that "no result," other than of a favourable nature, "has been arrived at, by any meeting held elsewhere," where a vote was taken on the "regulation" question. This is not remarkable, and for the simple reason that very few meetings have either discussed or voted on the question. So far as I am aware, it has not even been mooted in any meeting north of the Tweed, and has certainly never been discussed, in any shape or form, by the N. B. Executive. One result of Dr. Symes's motion will be that the question shall at least be brought into notice, and gain greater publicity. If, thereafter, it should be discussed thoroughly, and discussion prove favourable, Dr. Symes will be all the more justified in again bringing his motion before the Council.

Dunfermline, N. B. JOHN H. FISHER.

Sir,—Your leader this week, referring to the recommendations of the Pharmaceutical Society of 1871, regarding the storage and sale of poisons, might lead any one who has not been impressed with the inherent difficulties which belong to this subject, to suppose that these regulations were acceptable to the trade at the time they were offered, and had got over the difficulty. But it is impossible

to carry out the first named recommendation, simple as it is, without absurdities and inconvenience, unless the schedule of poisons be first revised. At the time of the previous protest against enforcing regulations I discussed the point with the Rt. Hon. T. E. Headlam, M.P., who was then an active promoter of legislation on all medical matters, including Poison and Pharmacy Bills. He said he did not think Government authorities would sanction regulations not based upon the schedules of poisons appended to the Pharmacy Act of 1868. He did not think it could be permitted to the chemist to use his discretion as to which preparations of morphia or opium should be subject to the proposed regulations; the strict letter of the law would include all preparations, and any exceptions would have to be legally made. He did not think the authorities would admit the right of a chemist to include at his discretion other dangerous bodies not named in the schedules, as subject in his own establishment to the regulations to be required of scheduled poisons. He did not know who was to determine which vegetable alkaloids were to be included under the term "all poisonous vegetable alkaloids and their salts," and he did not know that I should be justified in placing cantharidin in the poison cupboard until it was scheduled. He admitted that the regulations would necessarily divide the materia medica into two classes, one legally poisonous, and the other legally not poisonous. He admitted that extract of poppies would be required to have the danger signal upon it, and that extract of calabar bean and extract of Indian hemp would be required not to have the danger signal upon them.

He admitted that this was an absurdity, and that if in obedience to law I classified extract of poppies dangerous and extract of calabar not dangerous, and an accident followed from this arrangement, though I had acted according to law, I should probably not escape penalties. In the light of Mr. Headlam's replies to my propositions I felt that I could only consent to one form of regulation regarding storage, and that is what is already universally practised in the drug trade, namely, that all poisons should be clearly labelled with their name, and if it were deemed necessary to make a distinction between those which were poisons according to law, a difference in the colour or shape of the label should be all that would be required. I should consider the legal classification in itself a source of danger, by implying that those drugs which did not bear the mark were not dangerous, and to counteract this I advocated adding a label, entirely at the discretion of the pharmacist, indicating the usual adult dose, in which case the dispenser or salesman would be reminded of the danger in handling a drug which is active in small doses.

I commenced by saying that I do not think any poison regulations, such as the Society recommended, would be practicable, unless the schedule were revised. Let me add in conclusion my conviction that it is impossible so to revise the poison schedule as to make even those simple regulations an advantage to the public and the trade.

BARNARD PROCTOR.

THE CHEMICAL FORMULÆ OF SOLID AND LIQUID BODIES.

Sir,—Since your correspondent, Mr. D. B. Dott, virtually repeats an allegation made by Professor Attfield, who at a recent evening meeting of the Pharmaceutical Society condemned as "unscientific" the formula

$$(SbOKC_4H_4O_6,\tfrac{1}{2}H_2O),$$

which had been used by Miss Boole and myself in our paper on "Tartar Emetic," and moreover as there appears to exist, among pharmacists, some doubt as to our reasons for employing it, I think a useful purpose may, perhaps, be served if I very briefly point out the exact signification which is to be attached to this and similar formulæ.

First let me say that such formulæ are habitually employed by scientific chemists of the highest authority. It may be well to mention here a few, out of many thousand examples of such usage:—

($Na_2C_6H_8O_4,\tfrac{1}{2}H_2O$) Laurent, *Compt. Rend.*, 31, 151;

($C_4H_4Na_2O_8 2\tfrac{1}{2}H_2O$) Kekulé, *Annalen*, 221, 230;

($Pb(C_2H_3O_2)_2,NaC_2H_3O_2,\tfrac{3}{2}H_2O$) Rammelsberg, *Jahresb.*, 1855, 503;

($C_3H_9(CH_3)_2N_2O_3,\tfrac{1}{2}H_2O$) Hofmann, *Berichte*, 19, 2072;

($C_{10}H_{14}N_2O_2,\tfrac{1}{2}C_2H_4O_2$), Anschütz, *J. Chem. Soc.*, xlix., 72;

($C_{17}H_{23}NO_3,HI,\tfrac{1}{2}H_2O$) Ladenburg, *Berichte*, 14, 1870;

($K_2S_5O_6,I\tfrac{1}{2}H_2O$), Debus, *Journ. Chem. Soc.*, April, 1888, 332;

($C_5H_{10}O,NaHSO_3\tfrac{1}{2}H_2O$) Perkin, *Journ. Chem. Soc.*, xlix., 327.

Similar formulæ are also to be found in standard treatises and works of reference, such for example, as Watts' 'Dictionary.'

If then I have erred, as is alleged to be the case, precisely the same error is committed by the most eminent of chemical investigators.

But, in truth, no error is incurred by those who use these formulæ. They are accurate, and therefore scientific, expressions of ascertained facts of chemical composition; but they are not "molecular formulæ," and they are not intended, by those who use them, to symbolize "molecules," in the strict and only accurate sense of that word. "Molecular formulæ" are, in the present state of our knowledge, strictly applicable only to gases, not to liquids and solids. That is to say, we have no means of determining the "molecular weights" of chemical compounds unless these compounds can be gasified, and then the "molecular weights" are only applicable to gaseous "molecules," not to liquid or solid "molecules."

For this reason $SbOKC_4H_4O_6$ is not a "molecular formula." The "molecular weight" of tartar emetic is unknown, because tartar emetic is a solid compound which cannot be gasified without decomposition.

The formula written above is an empirical formula, that is, the simplest expression for the known composition of the substance; it is conveniently used to symbolize 323 parts by weight of tartar emetic. The formula of the crystallized salt ($SbOKC_4H_4O_6,\tfrac{1}{2}H_2O$) is, for the same reason, not a "molecular formula," and does not symbolize either "one molecule" of tartar emetic or "half a molecule" of water. It merely represents the fact that in the crystallized salt 323 parts by weight of tartar emetic ($SbOKC_4H_4O_6$) are combined with 9 parts by weight of water ($\tfrac{1}{2}H_2O$), a quantity of water which might otherwise be symbolized by the contraction ($\tfrac{1}{2}$ aq.).

Having regard to the fact that the above-mentioned weights are not "molecular" weights, I have long adopted the plan of referring to them as "formula weights" or "reacting weights," and these or similar expressions are now frequently employed by chemists, since they suggest no loose or erroneous ideas as to the exact meaning of the word "molecule."

WYNDHAM R. DUNSTAN.

THE SALE OF BLACK BEER.

Sir,—Perhaps to many like ourselves, who for above forty years have sold Dantzic beer, it may be of interest that we are able to say that the Board of Inland Revenue has no intention to depart from the usual custom of allowing black beer to be sold without an excise licence.

Seeing the conviction at Manchester, as reported in the *Pharmaceutical Journal* of the 3rd. ult., we began to be uncomfortable, and therefore at once put ourselves in communication with our supervisor. The following letter was forwarded to him as the result of our application.

Louth. "Inland Revenue, HURST AND SON.
"Somerset House, London, W.C.
"20th November, 1888.

"Sir,—Referring to your report of the 10th inst., I am directed by the Board of Inland Revenue to acquaint you that having carefully considered the matter they have decided to revert to their original practice, and not to interfere with the sale of black or spruce beer without an excise licence.

"The Supervisor, "I am, sir,
"Inland Revenue, "Your obedient servant,
"Louth. (Signed) "W. B. HEBERDEN."

[*** We have received from Mr. Wilkinson of Cheetham Hill a letter in which he states that the Inland Revenue Board has repaid Mr. Delve the fine and costs imposed in the above-mentioned action against him for the sale of black beer. It will therefore be evident that chemists who deal in that article need not now be in fear of excise prosecution.—ED. PH. J.]

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Monger, Hooper, Robinson, Wheldon, Foster, Guy Sapwell, Dixon, Brunker, Wilkinson.

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Fig. 3.
Double, for the Chest and Back.

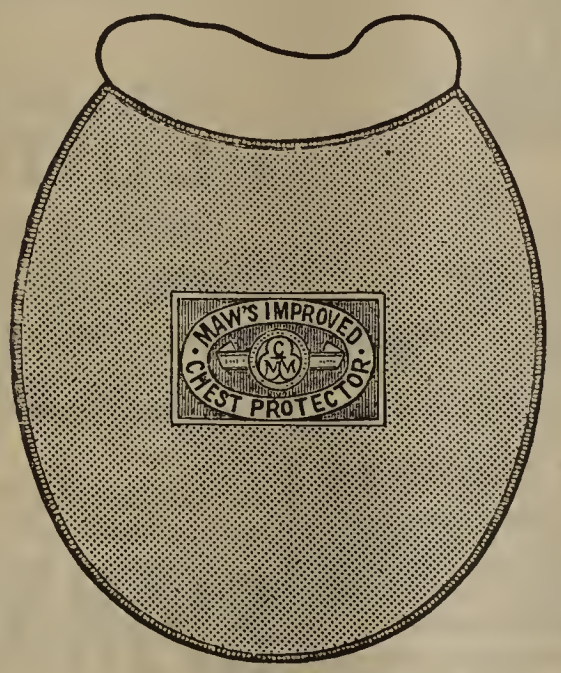

Fig. 4.
Single, Chest Protector.

Fig. 5.
Vest, a Shield for the Lungs.

CHAMOIS AND FLANNEL.

		No. 1.	No. 2.	No. 3.	No. 4
Fig. 3. Double	per doz.	20/	26/	32/	39/
Ditto, perforated	„	24/	32/	38/	46/
Fig. 4. Single	„	9/	11/6	13/6	16/
Ditto, perforated	„	11/	14/	16/	19/
Fig. 5. Vests „	„	27/	34/	42/	51/

FELT, ASSORTED SCARLET AND WHITE.

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
Fig. 3. Double, best, per doz.	17/	22/	27/	33/	44/
Ditto, second „	14/6	19/	23/	28/	37/
Fig. 4. Single, best „	7/6	9/6	11/	14/	20/
Ditto, second „	6/6	8/	9/6	12/	16/
Fig. 5. Vests, Scarlet „	17/	22/	27/	33/	40/

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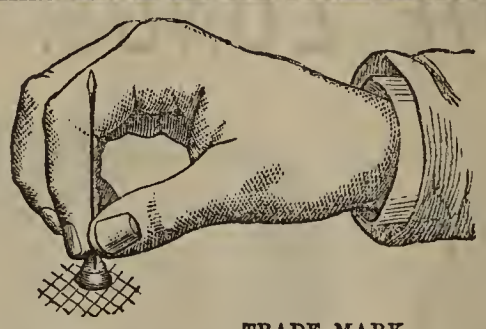

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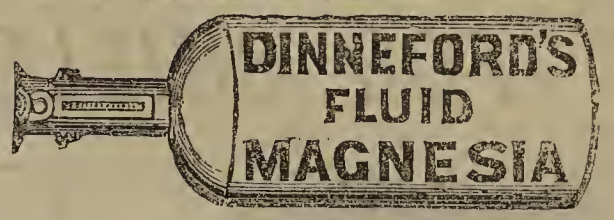

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Eleven passed. Four at their first attempt; Five at their second. See last week's JOURNAL.

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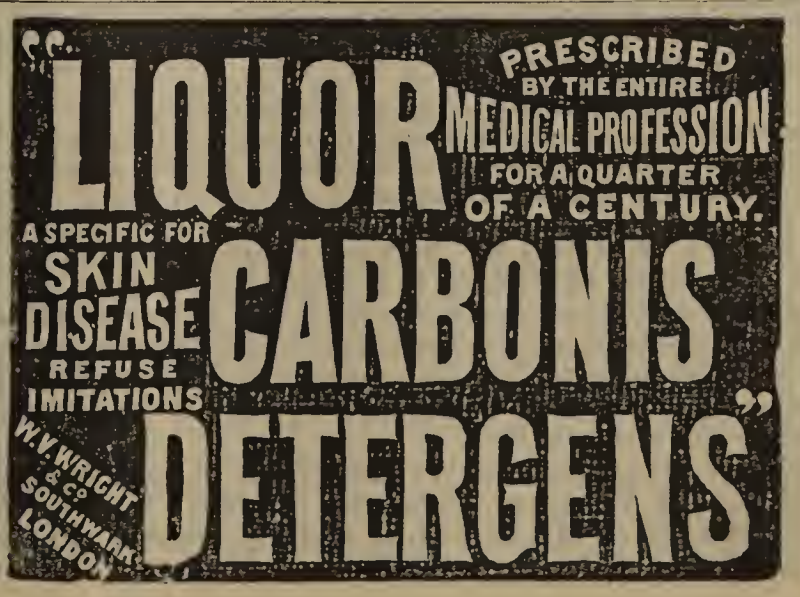

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The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 963.] SATURDAY, DECEMBER 8, 1888. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

17, BLOOMSBURY SQUARE, LONDON.

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The chair will be taken at Eight *precisely*.

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The Comparative Effects of Spirit of Nitrous Ether and Solution of Ethyl Nitrite. By Professor LEECH, M.D., F.R.C.P.

The Physiological Action of the Nitrites of Iso butyl and Amyl. By Professor CASH, M.D., F.R.S.

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TRADE MARK PROTECTION ASSOCIATION		2
TULLY, J.	Preliminary and Minor	17
VAN HOUTEN	Cocoa	15
WALKER & DALRYMPLE	Chemists' Tea Agency	17
WANTED TO PURCHASE		
WARNER, W. R., & CO.	Pharmaceutical Preparations	
WERNER & PFLEIDERER	Pill Machines	6
WESTMINSTER COLLEGE of Chemistry and Pharmacy		18
WHITE, A., & SONS	Manufacturing Chemists	2
WILLOWS, FRANCIS & BUTLER	Wholesale Druggists	15
WILLS & WOOTTON	Text Books	18
WOODS, W.	Areca Nut Tooth Paste	
WOOLLEY, J., SONS & CO.	Manufacturing Chemists	
WRIGHT & CO.	Liquor Carbonis Detergens	14
WRIGHT, LAYMAN & UMNEY	Wholesale Druggists	17

TRADE "SANITAS" MARK.

DISINFECTANTS

(FLUIDS, POWDER, SOAPS),

NON-POISONOUS, PLEASANT and BEST. Gold Medals—Calcutta, 1883-84; Paris, 1885; Antwerp, 1886.

THE "SANITAS" COMPANY, Limited, Letchford's Buildings, Bethnal Green, London.

SOLE MANUFACTURERS ALSO OF KINGZETT'S BACTERICIDES.

EUCALYPTUS GLOBULUS

We distil pure oil of Eucalyptus **GLOBULUS** as a by-product in the manufacture of our **Eucalyptus Boiler Fluid**, and are, therefore, enabled to place it in quantities at a lower rate than has heretofore been asked for it.

DOWNIE B. I. P. CO., 4, Redcross Street, LIVERPOOL;
And 204, MARKET STREET, SAN FRANCISCO.

S.V.R.

PURE GRAIN SPIRIT 56 O.P. ... 18/5
Do. Do. DOUBLE DISTILLED 18/9

Cash with Order. Reductions for larger Quantities than Two Gallons.

SAMPLES FREE.

STEPHEN SMITH & CO., BOW, LONDON, E.

PALATABLE.

RELIABLE.

THIS LABEL

AND THE WORD

KASAK

WERE REGISTERED

January 11, and February 1, 1888,

UNDER THE

Patents, Designs, and Trades Marks Act, 1883.

Trade Notice.

TO PREVENT DISAPPOINTMENT,

S. MAW, SON & THOMPSON

Beg to inform the Trade that their

ESTABLISHMENT WILL BE CLOSED

ON

Monday, Tuesday & Wednesday, the 24th, 25th & 26th inst.

FOR THE

CHRISTMAS HOLIDAYS

AND ALSO ON

Saturday and Monday, the 29th and 31st inst.

FOR THE

PURPOSE OF STOCK-TAKING.

7 to 12, Aldersgate Street, London.

December 1, 1888.

SHOP BOTTLES & JARS

WITH VITRIFIED (burnt in) LABELS.

Black letters on White or Pink ground. Glass Drawer Labels to match.

NEW POISON BOTTLES, ribbed blue glass, with **raised** White vitrified letters and the word "Poison" in Red at foot.

H. POTHS & CO.,

4, Creechurch Lane, Leadenhall Street, E.C. (late of Sugarloaf Court).

Telegraphic Address—"POTHS, LONDON."

A Standard List of Labels for Chemists' Shop Bottles, Jars and Drawers, has just been published, and will be sent free on application.

SMALL SETS AS SPECIFIED THEREIN KEPT IN STOCK, AS WELL AS POISON BOTTLES, LOZENGE JARS AND DRAWER LABELS.

"CARNABYN"

(REGISTERED)

A NOURISHING MEAT AND MALT WINE COMPOUND.

A stimulating tonic nutrient. DOSE—¼ to 2 ounces twice daily.

In Bottles, 2s. 6d., 5s., and 7s. 6d.

Of all Chemists and Wine Merchants, and the Manufacturers,

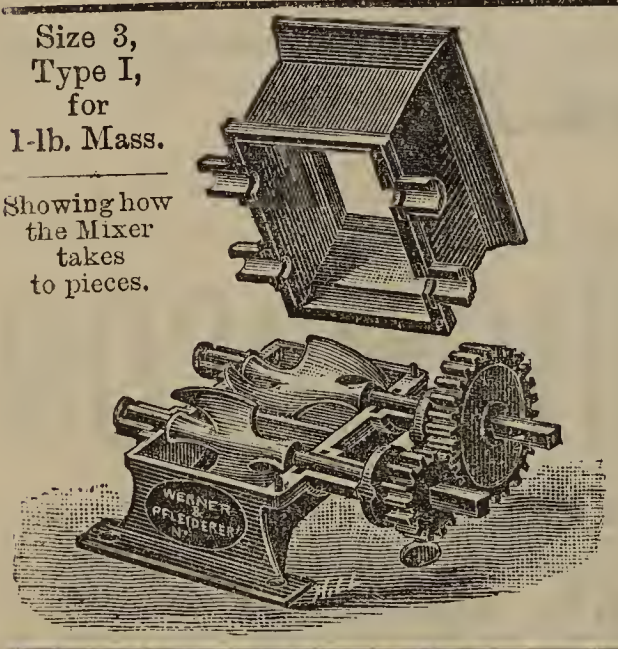
HOOPER & COMPY., Chemists, &c.,

55, GROSVENOR ST., and 26, DAVIES ST., W.; also at 7, PALL MALL EAST, LONDON, S.W

Laboratory—MITCHAM, SURREY.

Size 3, Type I, for 1-lb. Mass.

Showing how the Mixer takes to pieces.



THE "UNIVERSAL"

KNEADING AND MIXING MACHINE

AND ALL THE BEST

Pill Making Machinery and Appliances.

Machines for Horse Balls, Tooth Pastes, Ointments, Soaps, Powders, and for general Mixing, Incorporating, Sifting, &c.

Pill Rounding and Finishing and Coating Machines, and every requisite for the Pill Room.

WERNER & PFLEIDERER,

86, UPPER GROUND ST., BLACKFRIARS BRIDGE, LONDON, S.E.

BEECHAM'S PILLS.

MARK.

The most Marvellous Medicine of the Age for Bilious and Nervous Disorders, Indigestion, and Female Complaints.

The Demand is unprecedented, and the Sale is by far the Largest of any Patent Medicine in the World.

Prepared only, and Sold Wholesale and Retail, by

THOMAS BEECHAM,

ST. HELENS, LANCASHIRE, ENGLAND.

TRADE MARK

HEAD-QUARTERS FOR SPONGES

Telegraphic Address—"CUBANS LONDON."

FREDERIC R. CRESSWELL.
ERNEST J. J. CRESSWELL.
ALFRED G. CRESSWELL.
THEODORE C. SCHMITZ.

CRESSWELL BROTHERS

Sponge Importers & Merchants

SPONGES OF EVERY DESCRIPTION DIRECT FROM

GREECE, TURKEY, THE BAHAMAS, FLORIDA & CUBA.

2, RED LION SQUARE, LONDON, W.C.

(Next to Church), Also Nos. 1 & 13a, RED LION SQUARE.

GOLD MEDAL

(HIGHEST AWARD)

Awarded to CRESSWELL BROTHERS,

BRUSSELS EXHIBITION, 1888.

CRESSWELL BROTHERS' Sponges at the Antipodes.

From the "AUSTRALASIAN JOURNAL OF PHARMACY," August 20th, 1888, Melbourne Centennial Exhibition.

"CRESSWELL BROTHERS, 1 and 2, Red Lion Square, London.—This well known house has an admirable exhibit of all kinds of sponges, their exhibit being one which commands the attention of the most careless visitor to Australasia's great show, where there is so much to be seen. The sponges are displayed both in the natural and prepared condition, and include some very fine specimens. As is well recognised, this enterprising Firm has spared no trouble to meet the requirements of the retail trade, the high prices of sponges in recent years having made them rather expensive to stock in variety; but by their arrangement of carding, stringing, and classifying, it is easy to procure just the quality and quantity required for any business. The sponges bleached by the permanganate process are of exceptionally good colour and seem unaffected in quality by the process."

SPONGES by the CASE, BALE, BIN, STRING, BOX, CARD, POUND or PIECE.

For full particulars see Cresswell Brothers' new Illustrated Price List.

A SPECIALITY.—Natural and Unbleached Sponges packed at Cresswell Brothers' own Establishments at the Fisheries.

CRESSWELL BROTHERS, 1, 2 & 13a, Red Lion Square, (Next to Church), LONDON, W.C.

No connection whatever with a Company trading under a similar name in the same Square.

WILLOWS, FRANCIS & BUTLER

(Late BURGESS, WILLOWS & FRANCIS),

Wholesale & Export Druggists

AND

MANUFACTURERS OF PHARMACEUTICAL PREPARATIONS,

WHITE HORSE BUILDINGS,

101, HIGH HOLBORN, LONDON.

ESTABLISHED 1751. PRICE LISTS ON APPLICATION.

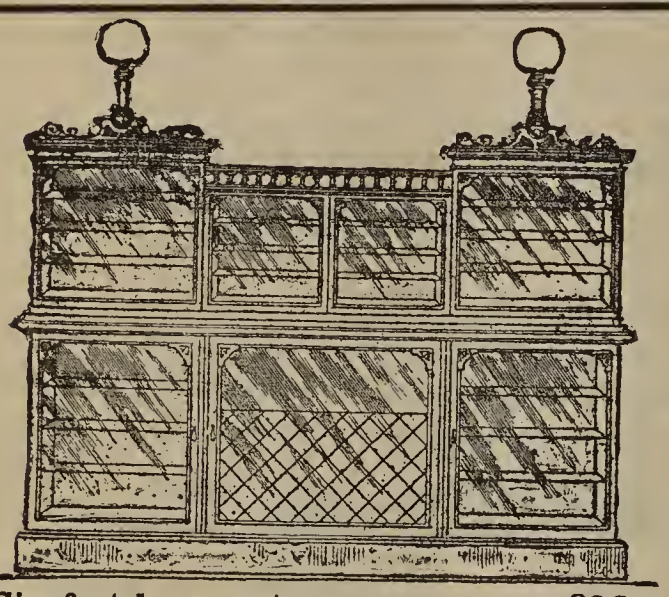
MEDICAL LABELLER AND ORNAMENTAL WRITER

ESTD. 1828.] **ON GLASS IN BURNISHED GOLD.** [ESTD. 1828.

Show Jars labelled inside to any design cheaper and equal to any other house in London. Glass Facias, Show Tablets and Glass Labels for Drawers, 7*s.* to 10*s.* per dozen, with cement and instructions for fixing. Gold Paper Labels forwarded to any part of the country on receipt of list at 3*s.* per dozen, all sizes. Shops labelled in any part of the country at 3*s.* 6*d.* per dozen on payment of third class fare and lodgings. Old Show Jars re-labelled equal to new. *A considerable discount allowed to Foreign and Wholesale Houses.*

ALBERT J. HARRIS, 120, Farringdon Road, W.C.

North end. Five minutes' walk from Farringdon St. Station.



Six feet long, net - £20.
If the Dispensing Screen only - £10.

"THE SPECIAL" DISPENSING COUNTER.

Designed from the ideas of some of the leading Chemists and Dispensers in London.

The counter has a solid mahogany top and plate-glass case front, the centre part fitted to take sponge.

A mahogany screen on top, consisting of plate-glass cases.

The back of screen fitted with small shelves for dispensing bottles, and the inside of counter with strong counter drawers.

BOWLING & GOVIER,

SHOP FITTERS,

Gun St., Brushfield St.,

Bishopsgate, London.

Notice to the Trade.

In consequence of inferior Secondhand Goods being sold for our make, we have found it necessary to protect our reputation for best work with a Trade Mark, as above, and unless goods are so stamped we cannot be answerable.

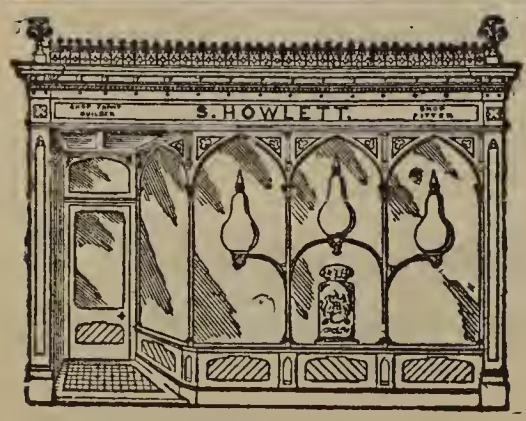
W. HAWKE & SON

SHOP FITTERS AND SHOP-FRONT BUILDERS

WILD COURT, GREAT WILD STREET, DRURY LANE, LONDON, W.C.

Medical Glass, Earthenware, Utensils, &c.

CLOSED AT 5 P.M.; SATURDAYS, 12 A.M.



S. HOWLETT,

Medical & General Shop Fitter,

SHOP FRONT BUILDER & SHOW CASE MAKER.

ESTABLISHED 1830.

4, LINDLEY ST., SIDNEY ST., Mile End Road, LONDON, E.

CABINET FITTER to the Pharmaceutical Society of Great Britain.

NUMEROUS REFERENCES may be obtained of Leading Chemists in all parts of the Kingdom.

SHOPS FITTED by Contract, in Town or Country, with every requisite, on the most improved principles, and at lowest prices.

A LARGE STOCK of New and Second-hand Fittings and Cases to be sold very CHEAP.

Export orders carefully Packed and Shipped. Plans and Estimates Supplied.

BULLOCK'S PEPSINA PORCI

Dose—
2 to 4 grains.

Since the introduction by Dr. LIONEL BEALE of PEPSINA PORCI, Mr. BULLOCK has devoted special attention to its manufacture.

BULLOCK'S ACID GLYCERINE OF PEPSINE

Dose—
1 to 2 drms.

Possesses at least three times the digestive power (and in most cases considerably more) than any other preparation of Pepsine and Glycerine, or fluid form of Pepsine whatever.

May be prescribed with most substances compatible with acids. In 4oz., 8oz and 16oz. bottles, and in bulk.

The published experiments of G. F. DOWDESWELL, Esq., M.A. Cantab., F.C.S., F.L.S., &c., Dr. PAVY, Professor TUSON, the late Professor GARROD, and others, conclusively demonstrate the marked superiority of BULLOCK'S PEPSINA PORCI AND ACID GLYCERINE OF PEPSINE over every other Pepsine or preparation of Pepsine—ENGLISH, FRENCH, GERMAN, OR AMERICAN.

*** *In prescribing either of the above preparations, it is suggested to insert in parenthesis as follows* (BULLOCK).

J. L. BULLOCK & CO., 3, Hanover Street, Hanover Square, LONDON, W

CONCENTRATED

PEPTONISED COCOA AND MILK

AND CONCENTRATED

PEPTONISED MILK

(PATENT)

These two preparations are made with pure rich PRE-DIGESTED Country Milk, and, by mere dilution with hot water, afford a delicious restorative beverage, the assimilation of which requires no digestive effort.

SAVORY & MOORE, LONDON.

Tins, 1s. 6d. and 2s. 6d. Obtainable everywhere.

PUMILINE

The only Pure Essence and Extract of Snow-grown Pumilio Pines.

FOR GOUT, RHEUMATISM, BRONCHITIS, SORE THROATS, AND CHEST AFFECTIONS.

THE SNOW-GROWN PINUS PUMILIO.

Sir MORELL MACKENZIE wrote, December 9, 1887.

"I have much pleasure in stating that I have made use of Oleum Pumilionis during the last twenty-five years, and that I consider it a most valuable preparation. It acts as an admirable tonic to the mucous membrane of the air passages in cases of chronic bronchitis and laryngeal catarrh. I am glad, therefore, to hear that the remedy is about to be used on a large scale, and I have no doubt the results will be highly satisfactory." (Signed) MORELL MACKENZIE, M.D.

Pumiline ALONE, with the single exception of Pinol, possesses the physical and chemical properties which give it the faculty of being administered with SAFETY. It is therefore essential for Chemists to use Pumiline, as it is the only preparation obtained from snow-grown Pumilio Pines.

For Trade Price Lists, Pamphlets, Analytical Reports, &c.,

G. & G. STERN, 11, BILLITER SQUARE, LONDON, E.C.

J. & W. BYGRAVE,

SHOP FITTERS,

111, SHEPHERDESS WALK, CITY ROAD, LONDON.

A note from the **CHEMIST** and **DRUGGIST**, page 358, September 15, 1888.

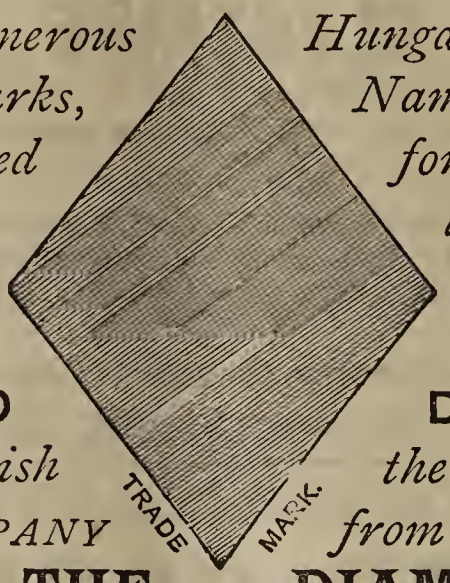
"An imposing shop has recently been fitted up at 243, Brompton Road, Kensington, by Messrs. J. & W. BYGRAVE, for Mr. W. B. TRICK. . . . . The shop is double-fronted, 43 by 21 ft., and is probably the largest Pharmacy in the West of London. The fittings are all of excellent workmanship, and the arrangements throughout are admirable. It is to be provided shortly with the Electric Light."

We have also fitted probably the largest Pharmacy in the North of London, for Mr. GRIFFITHS, 274, Seven Sisters Road, Finsbury Park. This shop has been admired by numerous Chemists for the style and neatness of the fittings, &c.

THE BEST NATURAL APERIENT.

The APOLLINARIS COMPANY, LIMITED, London,

beg to announce that, as numerous Hungarian Aperient Waters are offered to the public with Marks, Names, and Designations very similar to those which are used for the Hungarian Aperient Water (Hunyadi Janos) so long imported by them, they have now adopted an additional Label of their own, comprising their Registered Trade Mark of selection, which consists of a **RED DIAMOND.** *This Label will henceforth serve to distinguish the* HUNGARIAN APERIENT WATER SOLD BY THE COMPANY *from all other Aperient Waters.*



DEMAND THE DIAMOND MARK,

and insist upon receiving the HUNGARIAN APERIENT WATER *of the* APOLLINARIS COMPANY, LIMITED, *London.*

Of all Druggists and Mineral Water Dealers.

LOFTHOUSE & SALTMER,

Manufacturing Chemists, Wholesale & Export Drug Merchants,

HULL.

Manufacturers of all Pharmaceutical Preparations on the best and most improved principles.

QUOTATIONS ON APPLICATION.

SOLUT. ÆTHERIS NITROSI (Æther. Hyponit.)

1 part to 5 Sp. Vini Rect. 56 O.P. makes Sp. Æth. Nit. 850.

This concentrated preparation is carefully drawn in our own laboratory, is highly recommended, and is daily finding increased favour with the trade for making Sp. Nitre, as required for use, and thus avoiding the risk of a development of free acid, which is more or less prevalent in Sp. Nitre that has been drawn some time.

Price in Winchester Quarts, **3s.** per lb., net.

Importers of Cod Liver, Castor, and Olive Oils; Otto de Rose, and all Essential Oils; Valentia Saffron; Vanillas; Fruit Essences; Carmine; Aniline Dyes; Bees Wax, &c., &c.

APPLICATIONS FOR SPECIAL QUOTATIONS INVITED.

Since the introduction of Pepsine by BOUDAULT and Dr. L. CORVISART, BOUDAULT'S Preparations have been considered the most reliable.

BOUDAULT'S PEPSINE.

The Paris Hospitals have used no other.

PARIS, 1867. *HAVRE*, 1868. *LYONS*, 1872. *VIENNE*, 1873. *PHILADELPHIA*, 1877. *PARIS*, 1878.

Medaille Unique. *Medaille d'Argent.* *Medaille d'Or.* *Medaille de Merit.*

The Jury of the International Exhibition, Paris, 1867, awarded to BOUDAULT'S Preparations the *only* Medal given for Pepsine. Since that time it has taken the Medal at each of the International Exhibitions—Havre, Lyons, Vienna, Philadelphia, and Paris, 1878.

BOUDAULT'S PEPSINE—dose, 5 to 10 grains—in bottles, one ounce, 5/-; in bottles, half-an-ounce, 3/-

BOUDAULT'S PEPSINE WINE—dose, a tablespoonful—in bottles, 4/- and 8/-

BOUDAULT'S PEPSINE PILLS AND LOZENGES—dose, 2 to 4—in bottles, 3/3.

HOTTOT BOUDAULT, 7, Avenue Victoria, Paris. SQUIRE, 413, Oxford Street, London.

CAN BE HAD OF ALL CHEMISTS.

TO THE DRUG TRADE.

What the Journals say about Colgate's Cashmere Bouquet Toilet Soap and Perfume.

CASHMERE BOUQUET SOAP.—We reprint the following extracts from notices of this delightful toilet soap in order that the Drug Trade who have not already stocked it may see that it will pay them to do so, and to introduce it to their customers.

SPECIAL OFFER.—CASHMERE BOUQUET PERFUME.—To enable Chemists to introduce this perfume in a practical manner, we will supply thirteen bottles for each dozen ordered, the extra bottle to be opened and placed upon the counter, where customers may have an opportunity of trying it. The remarkable delicacy and fragrance of this perfume make it an article of ready sale.

From "Piccadilly."

I seem to have no end of novelties to tell you of to-day, and the last one is some new soap which hails from America, and is a most excellent article and pleasant to use, for I have got some. It is called Cashmere Bouquet, and is the invention of Messrs. Colgate & Co. The manufactory is 55, John Street, New York, but you can easily get it here.

From the "Star."

The other day, passing through Paris, I found as usual I had come without any soap. At an English chemist's I was offered, and accepted, a soap that was quite new to me—Colgate's. It is an exquisite soap, creamy, smooth, and with a ready lather. It leaves a beautiful feeling on the skin. After using it I felt for a while as if my complexion were as fresh and as smooth as a baby's. I don't know whether it has yet got into the shops. It ought to be popular. It is certainly a beautiful soap. A lady tells me it is especially good in London, as it softens the hard water. A friend of hers who went frequently to America had always to bring a packet back. Since she discovered she can get it here, she has been able to spare him this trouble.

From the "Court Circular."

It is somewhat remarkable that out of the two or three hundred exhibits at South Kensington no less than eleven stands are devoted to perfumery, and it is also noteworthy that, although some of the best English perfumers are here represented, it is to an American firm that the palm must be accorded, viz., Messrs. Colgate & Co., of New York, whose particular specialities are their Cashmere Bouquet and Cashmere Bouquet Toilet Soap, both of which are so refreshingly sweet, and so unlike any other perfumery we have come across, that of themselves they are sufficient to make the fortune of any firm of perfumers. The firm are said to be the largest and oldest toilet soap makers and perfumers in America, having received no less than thirty awards, and if the other preparations at all approach their Cashmere Bouquet, they well deserve all the honours they have obtained. The exhibits themselves form a highly artistic arrangement. Our opinion is that Cashmere Bouquet is positively unequalled.

From the "London Medical Recorder."

Colgate & Co.'s Cashmere Bouquet Toilet Soap.—This is a high-class toilet soap of a pale straw colour, highly fragrant, manufactured by Messrs. Colgate, extensive manufacturing perfumers, of New York. The firm make no less than 103 different kinds of soap, but the Cashmere Bouquet has obtained so much favour that, we are informed, the quantity sold last year exceeded that of all other fancy soaps imported into the United States. Messrs. Colgate & Co. have been lately awarded a Gold Medal at the Ostend Sanitary Exhibition for their Cashmere Bouquet Soap and Perfume.

Colgate's Cashmere Bouquet Soap, price retail 1s. 3d., per doz. 10s., per gross 110s. net
Colgate's Cashmere Bouquet Perfume, price 1 oz., 2s. 6d. retail, 22s. per doz., 255s. per gross; 2 oz., 4s. retail, 30s. 9d. per doz., 355s. per gross, of all Wholesale Druggists.

Depot: 67, Holborn Viaduct.

MAW'S
EARTHENWARE INHALERS
FOR
Hot Water, Infusions, &c.

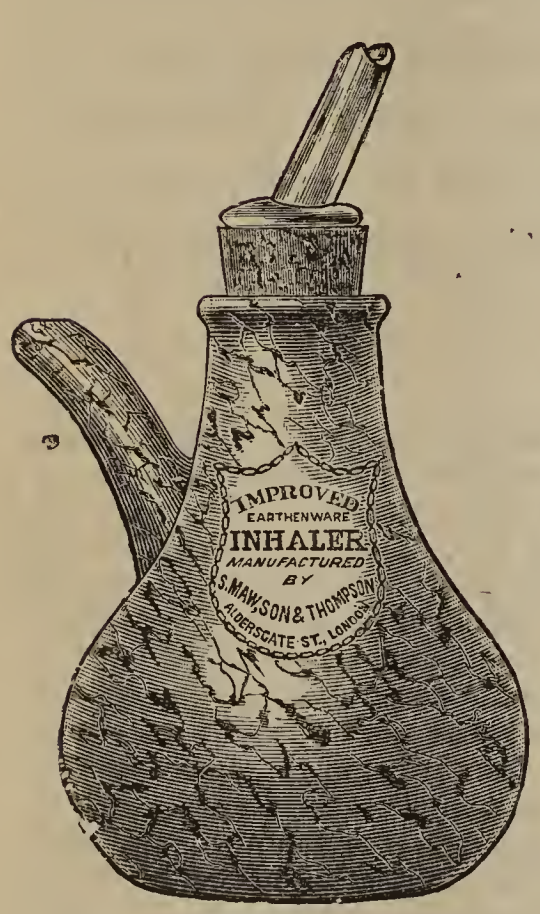


FIG. 8.
MAW'S IMPROVED.

FIG. 6.
MAW'S DOUBLE-VALVED.

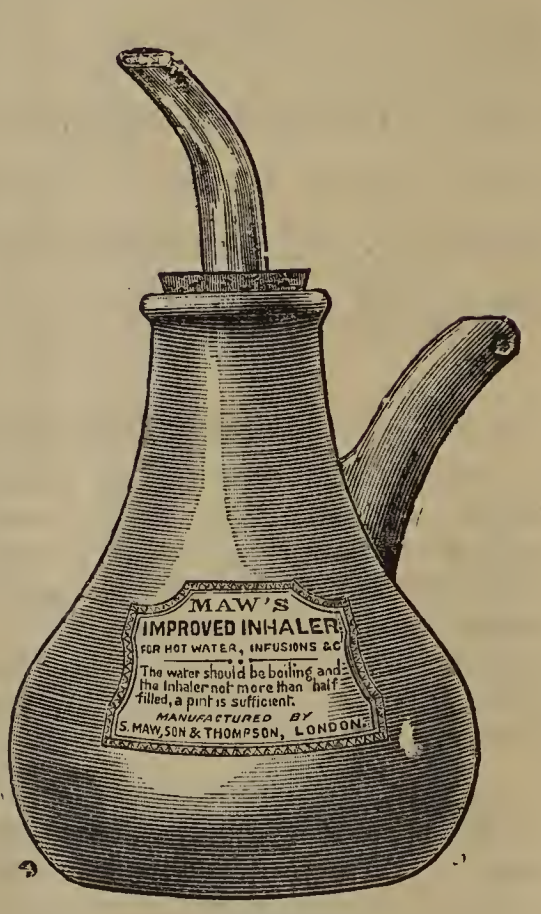


FIG. 8A.
MAW'S IMPROVED.

Fig. 6.—Double-Valved, 60s. per dozen; with Elastic Tubes, 78s.
Fig. 8.—Marbled, 32s. per dozen. Fig. 8a.—White, 21s. per dozen.
Fig. 8a.—White, half size, 13s. per dozen.

ELASTIC TUBES, with Mouthpieces, to fit Fig. 8 and 8a, 7 inches long, 8s. per dozen; 9 inches long, 12s. per dozen.

SPECIAL QUOTATIONS TO WHOLESALE BUYERS.

MANUFACTURED BY

S. MAW, SON & THOMPSON, LONDON.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 8, 1888.

THE BENEVOLENT FUND ELECTION.

The very lengthy report of the Council proceedings at the meeting held last Wednesday has made it necessary to exclude other matter to a great extent from the present number of the Journal; but as the election of annuitants of the Benevolent Fund is an event in which much interest is taken throughout the country, we cannot omit to draw attention to the point mentioned by the Vice-President as to the number of voting papers which are sent in either without signatures or otherwise informal. This year there were no less than seventy-two voting papers that were disallowed from one or other of these causes, and as they represented 228 votes it is possible that the loss of them may have materially influenced the results of the election. One of the circumstances which appears to contribute largely to the invalidity of voting papers is the impression that voters can give the whole number of their votes not merely to one candidate but to several. Evidently such an idea is very erroneous, and were it not that experience of several years indicates the prevalence of this view, it would be superfluous to refer to it.

It is satisfactory to find that on the present occasion a somewhat increased interest was manifested in the Benevolent Fund election. The number of voting papers received was considerably larger than last year, although the proportion they bore to the papers issued still left a considerable evidence of inaction on the part of persons having the right to vote. Upwards of two thousand of the voting papers were not returned, and if to that number are added the papers which were disallowed on account of informality, the result is that the number of active voters was not very much more than one-half of those entitled to take part in the election. This is a loss to the candidates, not only as regards the present election, but also by the reduction of their chances of success in future years, and we trust that neglect of this kind may be remedied by calling attention to the fact.

The number of occasional grants during the last month has been less than usual, not on account of want of funds, but for the more satisfactory reason that there had been fewer applicants for relief, and only in one case had the Committee declined to entertain an application. This was in itself a deserving case, but being one in which a widow was still carrying on the business of her late husband, it was considered that by making a grant the effect would be to place a recipient of aid from the Fund in an undesirable relation to those who subscribe to it.

In order to prevent disappointment, it may be useful to again call attention to the fact that the next Evening Meeting of the Pharmaceutical Society will be held on Thursday, the 13th inst., and not on Wednesday, as at first announced. A communication from the Research Laboratory upon the Chemistry and Pharmacology of the Nitrites of the Paraffin Series, will be the first business taken. It will consist of four papers:—(1) "Introductory," by Professor Dunstan; (2) "On Iso-butyl Nitrite," by Professor Dunstan and Mr. E. J. Woolley; (3) "On the Metameric Amyl Nitrites," by Professor Dunstan and Mr. W. L. Williams, and (4) "On the Constituents of Official Amyl Nitrite," by Professor Dunstan and Mr. E. J. Woolley. This will be followed by communications upon "The Comparative Effects of Spirit of Nitrous Ether and Solution of Ethyl Nitrite," by Professor Leech; "The Physiological Action of the Nitrites of Iso-butyl and Amyl," by Professor Cash; and "The Effect of Iso-amyl Nitrite," by Dr. Lauder Brunton.

* * *

We understand at the moment of going to press, that for the present session the further consideration of the Pharmacy Bill will be deferred, and as the result of a consultation between Sir Henry Roscoe, Dr. Farquharson, and the Vice-President of the Privy Council, it has been decided that the Bill shall not be put on the notice paper again this session.

* * *

A correspondent, writing in reference to the article on the rectification of the Register, suggests that prior to sending the two statutory registered letters the Registrar should send an unregistered letter. His reason is that in many instances where a person has "gone away" and left an address for letters to be forwarded to, the parties in charge object to the responsibility of signing for a registered letter, and refuse it, whereas an unregistered letter would be taken in and forwarded. This may be correct, but the failure to obtain information of change of address cannot be ascribed to such a circumstance, for the plan suggested by our correspondent is in fact adopted by posting a copy of the *Pharmaceutical Journal* to every person whose name is on the Register, and it is from the return of some of these journals through the Dead Letter Office that the Registrar is enabled to take the statutory proceeding of sending a registered letter with the notice as to removal from the Register.

* * *

We are requested to state that consequent upon the postponement of the Evening Meeting of the Pharmaceutical Society, the arrangements announced in the programme of the Chemists' Assistants' Association have been changed, the paper on "Standardized Pharmaceutical Preparations" by Mr. Francis Ransom having been read on Thursday, December 6, and the evening of Thursday, December 13, being set aside for a musical and social meeting.

* * *

The next monthly meeting of the Midland Counties Chemists' Assistants' Association will take the form of a supper which will be held at the Colonnade Hotel, New Street, to be followed by a musical and social evening. Tickets and particulars may be obtained from the Honorary Secretaries.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, December 5, 1888.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Allen, Atkins, Butt, Cross, Evans, Gostling, Greenish, Hampson, Hills, Martin, Newsholme, Nichol, Richardson, Robbins, Savage, Schacht, Southall, Symes and Watt.

The meeting on this occasion was held in the New Examination Hall.

The minutes of the previous meeting were read and confirmed.

New Member of Council.

Mr. WATT said he must take the earliest opportunity of thanking the Council for the honour done him in electing him a member of that Council. He assured the Council he felt it a very high honour, especially coming in the place of the gentleman who had resigned lately, who fascinated every one by his agreeable manners and cultivated mind. He felt a great difficulty in attempting to fill the position which Mr. Baildon had occupied, but he should endeavour, with the indulgence of his colleagues, to do his best as the representative of Scotland, and as the successor of so able a man. He had no doubt that the members of that Council would sometimes agree and sometimes differ; it would always be so when men took an independent course, but he wished to say that whatever ideas he formed, or whatever action he took, it would always be in the interests of the Society, and for the promotion of pharmacy.

Appointment of Examiners.

The Council went into committee to consider the appointment of pharmaceutical chemists as members of the Boards of Examiners.

On resuming the following were appointed the—

Board of Examiners for England and Wales.

Blunt, Thomas Porter, Wyle Cop, Shrewsbury.
Bowen, John William, 13, Curzon Street, Mayfair, W.
Corder, Octavius, 31, London Street, Norwich.
Druce, George Claridge, 118, High Street, Oxford.
Fletcher, John, 12, Montpellier Avenue, Cheltenham.
Gale, Samuel, 225, Oxford Street, W.
Gerrard, Alfred William, University College Hospital, W.C.
Greenish, Thomas Edward, 5, Bathurst Street, Sussex Square, W.
Ransom, Francis, Fairfield, Hitchin.
Saul, John Edward, 143, New Bond Street, W.
Symons, Wm. Henry, 130, Fellowes Road, West Hampstead, N.W.
Tanner, Alfred Edward, High Cross, Tottenham, N.
Taylor, George Spratt, 13, Queen's Terrace, St. John's Wood, N.W.
Thresh, John Clough, The Willows, Buxton.

Board of Examiners for Scotland.

Clark, Wm. Inglis, 104, South Canongate, Edinburgh.
Dott, David Brown, 104, South Canongate, Edinburgh.
Gibson, Adam, Thistle Street Lane East, Edinburgh.
Gilmour, William, 11, Elm Row, Edinburgh.
Kinninmont, Alex., 69, South Portland Street, Glasgow.
Maben, Thomas, 5, Oliver Place, Hawick.
Nesbit, John, 162, High Street, Portobello.
Stephenson, John B., 48, Frederick Street, Edinburgh.

A vote of thanks was passed to the Boards of Examiners for their services during the past year.

Retirement of Mr. Barnes.

The PRESIDENT also moved:—

"That this Council desires to record its high appreciation of the services rendered to the Society by Mr. J. B. Barnes during the eighteen years he has acted as an examiner for England and Wales."

He said that eighteen years was a large slice out of a man's life, but Mr. Barnes had been one of the earliest supporters of the Society, and he had not only done good work as an Examiner, but had contributed many papers for the advancement of pharmacy. While it was a matter of regret that on the technical grounds of age Mr. Barnes was no longer eligible as an Examiner, it was pleasant to be able to say that he was still in excellent health, and it might be hoped that the comparative leisure which his compulsory retirement would give him would enable him to do more work in scientific pharmacy than he had hitherto had time for.

The motion was carried unanimously.

Meetings of the Boards of Examiners in 1889.

The PRESIDENT then moved that the Board of Examiners for England and Wales should meet during 1889 in February, April, June, July and October. The meeting in the month of December was for the present omitted, as it was a question whether it might not with advantage be deferred for a month. He proposed to consult the Board on this matter, and report to a future meeting of the Council. There would be plenty of time to give notice to candidates if the above dates only were fixed at present.

The motion was unanimously agreed to.

The times of meeting for the Board of Examiners in Scotland were fixed for the months of January, April, July and October.

The Late Dr. Greenhow.

The PRESIDENT said since the last meeting of the Council one of the Honorary Members had been removed by death. Dr. Greenhow was in a certain sense an official of the Society, being the Government visitor to the examinations. In this capacity both the members of the Council and the examiners had been in the habit of meeting him on various occasions, and the appreciation in which he was held by the Council, after having filled that official position for some ten years, led to his being elected an honorary member. That being so, he thought it would be in accordance with the wishes of the Council if he, as President, were to address a letter of condolence to Dr. Greenhow's family. A resolution would probably be passed by the Board of Examiners, and perhaps the Council would authorize him to send such a letter. He need not say anything further, except to express the great regret which all would feel. They had lost the assistance of a distinguished physician, and a man of sterling common sense, who had the highest appreciation of the Society and of its work; a man whose views were so strong with regard to the main educational policy of the Society's work, that he had long felt that the Society should be the body, not only for qualifying pharmacists, chemists and druggists, but also professional scientific chemists. He had often heard him say that the Major examination of the Society ought to be so high that every pharmaceutical chemist should be practically a man of science capable of doing professional work in science. They must all regret that Dr. Greenhow's end, although happy in one sense, was a little tragic. He felt a little uncomfortable when leaving the department to which he was consulting physician, rode down to Charing Cross, felt a little faint, and was taken into a waiting room, and in half an hour had passed away. The comments which had been made on his career as a physician would be found in the

medical journals, and it was only in his capacity as a man of science, an honorary member, and Government visitor for the examinations, that it was necessary to refer to him there.

The VICE-PRESIDENT, in seconding the proposal, said he had not the privilege of knowing Dr. Greenhow so intimately as the President, but he had met him in that room and elsewhere on many occasions, and had been specially struck by the manner in which he entered into his duties in connection with the examinations. He did his duty most genially, both with regard to the candidates and also to the examiners.

The proposition was unanimously agreed to.

RESTORATION TO THE REGISTER.

The name of the following person who has made the required declaration and paid a fine of one guinea was restored to the Register of Chemists and Druggists:—

Frederick Craven, Horsefair, Pontefract.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee contained the usual recommendations that certain accounts should be paid.

The PRESIDENT, in moving the adoption of the report, said there was nothing special to call attention to with regard to the receipts. As to the Benevolent Fund, there were not many subscriptions usually received in November, and the chief source of income was from ground rents, which amounted to about £115. On the Donation account they had received £50 10*s*. He had noticed in examining the accounts that a very generous supporter of the Fund, not a member of the Society, but a representative of the trade—Mr. Charles Maw—had sent a donation of £40, in order to make up his total gift to the Fund to the handsome sum of £250.

The report and recommendations of the Committee were unanimously adopted.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to the widow (aged 40) of a former member and subscriber. Applicant has had three previous grants amounting to £35, the last in December, 1887, and has made other applications for assistance which were not entertained. She suffers from continued ill-health. (London.)

£5 to the widow (aged 30) of an associate in business who died in January, 1887, insolvent. She has two children, aged 6 and 7. (Kent.)

£5 to a registered chemist and druggist (aged 62) who is unable to work, and is dependent on her friends. She has had numerous previous grants amounting to £105 in all. (Edinburgh.)

£5 from the Robbins Fund to the annuitant whose late husband had contributed the largest amount to the Fund of any one now on the list.

One case had been deferred for further inquiries, and one the Committee had declined to entertain. The question of an organized canvass in London on behalf of the Fund had been again considered; and a further communication on the subject from Mr. T. C. W. Martin having been read, the Secretary had been requested to see him respecting it.

The VICE-PRESIDENT, in moving the adoption of the Report, said it was not necessary to enter into the financial question, which had already been touched upon by the President. It was a little gratifying to find that the list of applicants for relief was considerably shorter than in the previous month. There had been only five cases before the Committee, in three of which small grants had been made, and there was nothing requiring special comment, excepting one case from Scotland, in which the late Mr. John Mackay had taken great interest. In going through the papers in connection with that application, it was very gratifying to the Committee to find that the descendants of Mr. Mackay still took an interest in the case. There was one other case which it might be as well to refer to, in which the Committee declined any relief, because the business was still being carried on for the applicant. The application was that of a widow, a very deserving case, no doubt, who was applying for help, but she was still carrying on the business of her late husband. It had been for many years the policy of the Committee not to make grants where the effect might be to bring into collision those who were contributing to, and those who were receiving aid from, the Fund, and therefore no grant could be made. The Committee had again considered the proposition put before it by Mr. T. C. W. Martin, and he hoped that in due time good fruit would come from it. He also desired to call the attention of the Council to the fact that at the next election for the London Orphan Asylum at Watford, one of the candidates was Frederick H. Lees, who was an orphan of a chemist and druggist, and the Committee would be very glad if members who had votes or influence in this election, would use them in favour of this candidate.

The report was unanimously adopted.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
October	Day . . .	919	46	18	34
	Evening . .	240	21	3	10

Circulation of books.	Town.	Country.	Total.	Carriage paid.
October . . .	179	137	316	£1 10 9½

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Index Catalogue of the Library of the Surgeon-General's Office, U. S. Army, vol. 9, 1888.
Medical and Surgical History of the War of the Rebellion, part 3, vol. 1, 1888.
From the SURGEON-GENERAL.

For the Library in Edinburgh—

Murray (R. M.), Chemical Notes and Equations, 1888. From the PUBLISHERS.

The Committee recommended that the undermentioned books be purchased:—

For the Library in London—

Roscoe and Schorlemmer, Treatise on Chemistry, new ed. of vol. 1.
United States Dispensatory, new edition.
Tschirch, Pflanzenanatomie, part 1.

For the Library in Edinburgh—

United States Dispensatory, new edition.
Edinburgh University Calendar.

The Committee recommended that additional accommodation for books be provided on the top of the present cases.

Museum.

The Curator's report had been received, and included the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
October	Morning .	687	39	10	24
	Evening .	118	12	1	4

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimen of the Labdanum plant (*Cistus ladaniferus*). From Professor SOUBEIRAN, Montpellier.
Microscopical slide of the root of *Hemidesmus Indicus*. From Mr. J. H. HART, Manchester.
Specimen of new variety of Gum Arabic from the West Coast of Africa. From Mr. W. W. GREEN.
Specimen of the bulb of *Allium MacLeanii* (*Badsha Salep*).
From Surgeon-Major J. E. AITCHISON, F.R.S.E., etc.
Fresh seeds of *Ferula fœtidissima* and *Ferula Sumbul*. From Mr. ANDREW FERREIN, Moscow.
Specimens of the Ipoh arrow poison and of the roots used in its preparation; for investigation.
From the DIRECTOR, Royal Gardens, Kew.
Specimens of the barks of *Cinnamomum xanthoneurum*, *Sassafras Goesianum* and *Tetranthera citrata*. From Professor Van EEDEN, Haarlem.
Specimen of crude Sperm Oil from the Seychelles.
From Messrs. WRIGHT, LAYMAN AND UMNEY.
Specimen of Bichromate of Sodium.
From Messrs. STEVENSON, of Glasgow (through Mr. Kinninmont).
Specimen of the fruit of *Eugenia Jambolana*.
From Mr. GWILYM EVANS.

The PRESIDENT moved the adoption of the report, which he said contained nothing requiring special notice.

The motion was at once agreed to.

MOTIONS FOR GOING INTO COMMITTEE.

The PRESIDENT then said he thought it would be convenient to defer the report of the General Purposes Committee until a later period, and he would therefore ask Mr. Evans to move the resolution of which he had given notice.

Mr. EVANS then moved the following resolution:—

"That members be at liberty to give reasons for and against on motions to go into committee, in like manner as on other motions, and that any standing order contrary thereto be rescinded or modified accordingly."

He said he thanked the Council for allowing him to move that in open Council without going into committee, and also for the consideration he had always received since he had been a member. The only point on which he felt out of touch with his colleagues was on this particular question of reporting. He had always found willingness to concede freedom of opinion, and if a little more work done in Council were reported he thought it would be better for the Society in which they were all interested. He might say at once that there was nothing whatever done which any member of the Board need be ashamed of; on the contrary, he was satisfied that every man did his level best to do the work of the Council for the advantage of the trade at large. At the same time, he believed that if the interest of the chemists throughout the kingdom was to be awakened in the Society, the Council should act on the principle which was carried out in the best Institution, not only in that country, but in the whole world—the British House of Commons; and the time would come when it would do away with the old system of talking about pharmaceutical politics in secret, and he thought much more might be reported of the work of the Council than was now done. There were many committees, the House Committee, the Library Committee, the Finance Committee, the Benevolent Fund, and the General Purposes Committee, but there was one meeting once a month when the whole Council met to represent the chemists of the country. The Society was a thoroughly democratic institution. The Council was elected by a certain number of people, and the members were supposed to be there to discuss questions which affected their constituents as much as themselves. There were many people outside the Council who understood the welfare of the Society as well as those who by accident had time and opportunity to become their representatives, and it was only fair that all their constituents should know exactly how the work was performed. This question to which he was drawing attention arose at the last meeting. He would not go into the merits of the question, but a gentleman had given notice that a certain question should be discussed by the Council, and notice was given openly, and it was discussed in various journals, and he was never more surprised in his life than to find that there were gentlemen on the Council prepared to move that a question which affected the trade at large should be discussed in committee. He had come prepared to do what he could to oppose the motion; but at the same time he thought it was only fair to allow Mr. Symes to give his reasons publicly, and to convince as many as he could on the Council and of the outside trade of the soundness of his views. Another question on which he wished to touch as lightly as he could was that very frequently the President would, without the slightest warning, announce that the Council would go into committee. Upon one or two occasions someone had had the courage to get up and propose that he should not do so: but those who did so soon found that they were rather rash and that the majority were against them; and unfortunately those who held views of that sort were frequently considered to be antagonists or agitators or anything but agreeable to the majority. At the same time it was only right that men should have the courage of their opinions and support them. He did not say that all the work of the Council ought to be reported, but in his opinion there was not enough reported, and if this practice went too far, and if there were an attempt to limit discussion in any way he thought members should be allowed to give reasons for and against going into committee, and at any rate a limited time should be allowed for discussing that question. He certainly did think there was a tendency on the part of the Council to go into committee on questions which had very much better be discussed openly. The President had himself said that he had a very good team and he drove them very well; the leaders were well in hand, the shaft horses were pretty steady, and so on. But he thought there was another simile which gentlemen who were acquainted with natural history would appreciate. He might compare the President to an opossum—an animal which took very great care of its young, especially when they were in any danger—and he thought the President exercised a little too much protecting care over the members of the the Council. They were supposed to be men who knew what they were talking about; but if a man came there and talked about what he did not understand, let him be reported, and let his constituents know that he was not fit to be on the Council. He knew that he himself was hasty and rash, but he did not want the protecting care of any man to look after him. If he came there and expressed his views, let them be reported, and if they were not in accord with the wishes of the chemists of the country, let them know it, and let them select a better man. One of the ideas frequently put forward which he thought should be an exploded idea was, that if their constituents had not confidence in them they would not be returned. But how did the constituents know whom to select? They found a list put before them of candidates, and he had known men put a tick upon a certain number of names and say that as to the rest they did not know anything at all about them. They read the Journals, but they only knew what appeared on the surface, and could not tell what views these men held on particular points. Until this was remedied there would not be the interest in the elections that there ought to be. It might be argued that things would be said which it would not be to the advantage of business or of the

Society to make known; but it was the same with regard to Parliament. Many things were said which it would be very much better should be left unsaid, and many things would be better not reported: but no candidate for Parliament would dare to suggest that the proceedings in Parliament should be kept secret. The original idea of the Society was the most democratic idea possible—that there should be an opportunity of changing the representatives every two years; but in order that this right should be properly exercised, the members at large ought to know what the views of their representatives were, and see whether they acted up to them. If the members did not take an interest in the elections, a time would come when they would not subscribe, and this was a serious point, for there was a tendency at the present time to say that it was not worth while belonging to the Society. Once awaken the interest of the chemists of the country in the Society, and they would be only too glad to continue their subscriptions, and if necessary to increase them. He had gone so far as to say on that Council that even if a Bill were brought in which they knew perfectly well they could not succeed in passing, still, if it were a means of uniting chemists in one common object, it would be a grand thing. He had only one more remark to make, and that was a repetition of what he had already said—that if a little more fresh air were admitted and more information given, it would be better for the trade. In his native country there was a saying "Every man has a right to his opinion, and every opinion has a right to its expression"; and he thought if the Council acted more on that principle, and let the chemists of the country know the views held by different members, and that every member of the Council, from the President downwards, was doing his level best in the interests of the Society, it would have a very beneficial influence. What had surprised him more than anything else was that a gentleman so keen and so well able to manage as the President had not seen his mistake in this matter long before.

Mr. SYMES, in seconding the motion, said he had not prepared anything to say with reference to it, for he did not know until he came there that he should be asked to do so; but he was pleased to see the motion on the paper, and thought it a very proper one, though it might require a little modification. It might be said perhaps that the Council went into committee as a matter of course on the business of the General Purposes Committee, and no one objected to it; but if this motion were passed it would not interfere with that, because no one would question the prudence of so doing. He had always felt, from the first day he became a member of the Council—and in fact long before—the importance of more of the work being done in open Council and being reported. He had pointed out before that in years gone by he read the proceedings as they were published, and they were published more fully then than they were now in some instances, for on looking back to the Journal of twenty years ago he found that in nearly all divisions the names were taken, but that seemed to be a thing of the past. Whether it had been found undesirable or whether it had been thought better that members of the Society in the trade outside should not even know how they voted, he was not sure; but so it was; and at the time referred to he often failed to understand what the Council was doing from the very short cut and dried reports otherwise than from the divisions, which certainly gave information as to the way men voted; but very often there were no sufficient arguments stated to enable him to judge why they had voted one way or the other. One of the first things he attempted to do as a member of the Council was to try and get greater publicity by introducing outside reporters and so on, and to some extent that worked well for a long time, until the Council got into the habit of going into committee too frequently, for it seemed to have been the idea for some years past to go into committee whenever anything was to be discussed which was not fairly cut and dried and considered beforehand. He knew of no greater farce than for a number of men to sit and deliberate and talk and discuss any matter, and then to resolve themselves into committee and say what had been arranged. But that, he was sorry to say, had to be done simply because they did not like free discussion in open Council. He was perfectly nonplussed on the last occasion when moving a resolution, which had been made public in that room and in the press, to find it suggested that it was unsafe to discuss such a thing in open Council. The members of Council had been told from time to time that they were not mere representatives or delegates, although he did not consider it any reproach to be a representative or delegate. He considered that they were representatives of the commonwealth, and that it was their duty to give something like an account which could be criticised of what they did. The object of the motion was that if on any occasion when it was proposed to go into committee any member who wished might argue the point; he could not argue the matter to be considered, but he might certainly argue the question of going or not going into committee. On the last occasion it was announced that the Council would go into committee and no discussion was allowed. He was not sure that there was a standing order to that effect, and he thought it very desirable to know before proceeding further with this discussion whether there really was a standing order to that effect or not.

The PRESIDENT said he had never suggested that there was a standing order. On the last occasion he said the *custom* was and always had been to vote on the question of going into committee without discussion.

Mr. SYMES said he thought the Council would strengthen its position by having more open discussion; it would induce the members of the trade to take more interest in the proceedings, and would answer to some extent the question which was often put, What was the Society doing, and what good did it do? That question was put perhaps more frequently in the country than in London; but he found in his official capacity as local secretary that it was always thrown at him when collecting subscriptions, and he suggested that if matters were discussed in Council and not in committee, then the members of the trade would know what was going on. Then, again, there was the inconvenience of reporters having constantly to retire, and he was bound to say he did not think the reporters were treated with the confidence they should be. In this country every man was held to be innocent until he was proved to be guilty, and he took it that men should be trusted until it was shown that they were not worthy of trust. He thought it interfered very much with the business of the Council, this constantly going in and out of committee. On the present occasion the order of business had been altered, simply because the Council must go into committee to do something and must ask the reporters to retire. He hoped the Council would see the prudence of passing the resolution by a large majority, if not unanimously.

Mr. HAMPSON desired to congratulate the mover of the resolution on the able manner in which he had presented the question, which he was very glad had been brought forward, for although he did not exactly agree with the wording of the motion, it gave him the opportunity of entering his protest against the action of the Council at its last meeting. The motion of which due notice—almost undue notice—was given by Mr. Symes, had a privilege attached to it. Mr. Symes would not have given notice of it if he had supposed

that the doors would have been closed, and that the discussion upon it would be taken *in camerâ*. He thought the action at the last Council meeting was distinctly unjustifiable, and he demurred to it entirely. In the first place it was essentially unconstitutional. There was no standing order in its favour; and if he had occupied the presidential chair he should certainly have refused to receive a motion on those lines. He believed the motion was entirely out of order. He knew the reason why it was supposed to be desirable to go into committee, namely, that some member of the Council might possibly not express himself as he should.

The PRESIDENT asked Mr. Hampson if he thought it was within the terms of the motion to refer to something which had actually dropped; he hoped he would discuss the question more on general grounds.

Mr. HAMPSON said he would be as general as possible. He understood the reason that it was deemed to be desirable to go into committee was that some member of Council might not express himself in becoming terms on the motion which might be before the Council at the time. That was a manifestation of want of trust in the discretion, ability and common sense of the Council, which he deprecated and repudiated. If any member of Council should happen to be weak and unable to control his methods of expression, let him have the opportunity of speaking before the reporters and be subject to the right kind of criticism outside. It was only fair to the member that he should have the opportunity of making progress in these matters. He was sure every member of that Council was able to so express himself as not to damage any question which was brought forward. He hoped, at any rate, that this motion would pass, so far as it affected motions of which due notice had been given. He quite understood the desirability of some matters being discussed in committee, but still he would do it as seldom as possible. He entirely endorsed the advantage of discussion in open Council, because members of the trade were entitled to know what was said on these questions. The members of the Council were sent there for the purpose of discussing these things openly and dispassionately, and it was due to them and to the members themselves that they should have a fair opportunity of doing so.

Mr. HILLS said he had hoped someone more competent would have got up to oppose this motion, because he thought there was a good deal to be said on the other side. He hoped the motion would not be passed, but it was the general subject of reporting, rather than the exact motion itself, which had been discussed. All the members of Council were anxious to give as much information as possible to the members of the trade, especially on matters of general policy, so far as was consistent with wisdom; but they had duties first of all towards members of the Society, then towards members of the trade at large, and also towards the public; and there were many occasions on which it was not wise to discuss matters in public. Mr. Symes had used the expression "unsafe," but he would rather say it was unwise in many of their multifarious duties to discuss matters in open Council. They all had the welfare of the members at heart, and they also had to consider themselves. They were more or less busy men who endeavoured to get through their various duties with as much expedition as was possible, bearing in mind the importance of the matters to be discussed. He would ask whether it was likely if such a resolution were passed, that the general question, which the majority would wish to have taken in committee, could be kept out of the discussion on the motion for going into committee. It would require a very watchful chairman to keep the discussion on the right lines, and to prevent it overlapping what the majority, in the case supposed, would wish to be taken in committee. If the Chairman were not very alert matters would be brought out which would only have to be discussed the second time, and this would be a distinct waste of time. He did not think it was the first duty of that Council to supply materials for public discussion; the great object was to do what they as individual members thought best and wisest for the various classes they represented directly or indirectly.

Mr. SCHACHT thought the Council would probably have heard ampler reasons from Mr. Evans for the introduction of this motion than he had thought fit to give. He had endeavoured carefully to follow him, but was at a loss to find that he and his friends had any real grievance. He sympathized thoroughly with every word which had been said about the desirability of making all the proceedings as public as possible, and that was the opinion of everyone. Possibly there was a time when it was not so, and he remembered taking part in the early discussions to which Mr. Symes had alluded, when representatives of the press from outside were first invited to attend their meetings; but he thought now they had all come to an agreement that it was desirable to publish everything as far as possible, and he could not help thinking that this discussion would not have been raised had it not been for the proceedings at the last meeting. It was these which had forced this matter into prominence, perhaps very properly; at any rate he was very glad it had done so in order that some members might express themselves distinctly on this question. Those proceedings were exceptional and, therefore, an exceptional result followed. He would rather not discuss those proceedings if he could help it, because it was rather difficult to refer to matters which had still left a disagreeable impression on the minds of some; but on the general principle something might be said, and he would appeal to the three gentlemen who had first spoken, whether it was not desirable in fact that the Council should have the power of determining whether any question should become a public question or not. The whole proceeding of to-day was a protest against what was done at the last meeting; but he could not help thinking that the Council was thoroughly justified on that occasion. It was not at all unconstitutional in its action, as had been contended, to go into committee after notice had been given. A notice of motion need not be given earlier than the day before the circular convening the meeting was issued. It might be sprung upon the Council as an absolutely new question, and it surely must be in the power of the Council to say—this is not a proper subject for public discussion. That was the point which he wished to place before the Council; he had no objection to any process which should secure the Council in that respect, and which might be preferable to the plan adopted the other day, but on that occasion there was no help for it. The matter was brought forward for public discussion by a man who had a perfect right to do what he did, and who, no doubt, thought that it should become a public question; but if it was a question in which those who held that view were in a minority, perhaps of one or two, what would happen then?

Mr. SYMES remarked that Mr. Hampson had been called to order for referring to what passed on the last occasion, and he did not think Mr. Schacht ought to be allowed to do it. Mr. Schacht was not an authority on procedure, and he had no right to go into the matter if Mr. Hampson had not.

The PRESIDENT said Mr. Schacht was not out of order, and he had not actually ruled Mr. Hampson out of order; he only asked him to make his remarks as general as possible, and he had no doubt Mr. Schacht would do the same.

Mr. SCHACHT said he would endeavour not to do anything out of order. Mr. Hampson was endeavouring to show why the Council did this, that and the other, but he would not enter into that point at all; he was only asking his fellow Councillors to consider whether they had or had not a right to declare at any moment that a subject should be a public question, and on that point he held a very strong opinion. Another process might be adopted than the one followed the other day, but on that occasion the Council could not help itself; it was too late then, and what he wished to urge was, that when any important question was in the mind of any member of the Council, it was highly desirable that he should first test the opinion of his colleagues in some committee, so that the Council should not be driven again into the unfortunate difficulty in which it was placed last month. It was a difficulty, and he was extremely sorry for it. He took no part in the vote to go into committee, for he was taken by surprise to a certain extent; but he approved of it, nevertheless, now on further consideration, and thought that the Council had no alternative. It appeared to him very desirable that everyone who had an idea of his own, before he made it a public question should consult with his colleagues to some extent. The opinion might be taken of the General Purposes Committee, or some such committee as that. The idea might be an exaggerated one, or it might be highly valuable; but, at any rate, the person who brought it forward would be strengthened by the fact that he had talked it over with some of his colleagues and obtained their consent or distinct disapproval; he would be strengthened in his speech or silence as the case might be. It was highly desirable that such a plan should be adopted, rather than that the Council should be driven to the necessity at the last moment of voting that the discussion be taken *in camerâ*.

Mr. WATT said he did not like to give a silent vote on this occasion, especially as it might be considered in some way a reflection on the President, which he should not like to be a party to. He had listened with very great pleasure to the temperate and very sensible speech of Mr. Evans, and he did not see anything in the motion to which there could be the slightest objection. If the Council chose to go into committee, any member had a right to state his reasons against it; he thought that would not be doubted any more than it was doubted that the Council had a right to go into committee when it chose. What Mr. Evans asked was that any member who objected should be allowed to state his reasons, and that was always allowed in any well ordered society, and it would be for the Chairman to keep him in order if he travelled beyond the question. On the main question he might say that in the north, in the council to which he belonged for forty years, they had always endeavoured to let daylight in on every subject. No doubt there was a general opinion that too much of the affairs of the Society was conducted in committee, and that there was not the same interest taken as there would be if there were more open and free discussion. No doubt there might be errors committed in open discussion on any subject, but he thought much greater error was committed when it was conducted in secret. His friends in the north had felt that they had not as full an opportunity as they desired of knowing what took place at that Council. The motion referred to the alteration of any standing orders which would interfere in it, but he should be very much surprised if there were any standing order to that effect. He thought it was usually the custom on such occasions for the Chairman to ask the members whether they were disposed to go into committee, and that gave them the opportunity of saying whether they would or not. He did not think the President, with all due deference, had a right to go into committee without the consent of the Council, asked and obtained.

Mr. RICHARDSON thought Mr. Watt was under a misapprehension. The President always had the consent of the Council before going into committee.

Mr. WATT said he had been present that morning when the President had announced that the Council would go into committee. He quite admitted that the Council should have the power to go into committee, and that it was necessary occasionally to do so, and that it would be very unwise sometimes not to do so; but the general rule should be established that the seldomer this was done the better, and that all subjects which came up should be openly discussed as far as possible, so that their constituents should, as they had a right to, know how they voted, and why they voted as they did. He specially wished to guard himself, however, against any expression intimating any censure on the action of the President.

Mr. ALLEN said he was very pleased when he saw this motion put down on the agenda paper, because he felt that it was a subject which was very little understood. It had been the subject of some controversy by the members generally, and it did appear to him that it was one which might very well be discussed at that table, so that members outside, on reading what was said on the subject, would be able to understand the matter very much better than they did at present. Mr. Evans had put the matter very temperately indeed from his point of view, and it did appear that there could be very little objection to what he had said; but he must ask the Council to remember that upon all questions of going into committee on general questions the President always consulted the Council as to whether this should or should not be done. The matter which Mr. Watt had just alluded to was one of those matters of formal detail which were repeated several times during the course of the year's business, on which the President knew perfectly well that the custom was to go into committee, and that there was not a man against him. If there were a majority against him he would know immediately. On all questions on which there could be any argument, or on which the Council was in any way divided, the habit invariably was to take the opinion of the majority. He would also say that it was a difficult task for any President of the Pharmaceutical Society to get through the business in the few hours allotted to him, and as he had been one of those who had voted on several occasions for going into committee, he should like to say that he had not done so in the sense of following his leader like a sheep, but because he had considered that the question was one that should be discussed in committee. He would like most decidedly to stand by the present President, and to defend him from any idea that he in any way was leading and unduly influencing those who voted for going into committee. Such was not the case. The Society happened to have a President at the present time who was a man of strong character, well able to influence others if he cared to do so; but he must say that never in the course of his experience on that Board had the slightest pressure been placed on him to influence his vote in any way. What was the hardship? He listened intently to Mr. Evans, but failed to see any hardship of any kind. When the question of going into committee occurred, the majority of the Council was consulted; either it did approve, or it did not. Now, what was the way to conduct public business? He said most decidedly that when there was a large majority who considered that a question would be better discussed in committee than publicly, the loyal minority should bow to that decision. There was no other way of conducting public business, as far as he could see. He did not want to allude to any question that

had passed by, but there were numbers of questions which came before the Council on various matters, questions which affected the Council itself, the public departments in touch with the Council, and pecuniary matters, and the Council always reserved to itself the power of being able to discuss such matters, and any others it might think fit, in committee. After they had been discussed in committee they might fairly come before the members afterwards. The Council was neither a vestry nor a town council. It was a body of men elected by the Society, who were sent to do the business of the Society, and he had yet to learn that it was charged, except by a few interested parties, with any lack of business capacity in the conduct of its affairs. If he had any motion to bring forward, and put it forward either two or three days or a month beforehand, how could he expect any gentleman who came there to stand up and discuss a question, which he might have been considering for months or years, without previously discussing it amongst themselves. That body was very different from a vestry or town council, where the members all resided close together, and had the opportunity of communicating with each other. They were all busy business men, living in different parts of the country, and could not possibly be writing long letters to one another during the course of the month, and he had known cases where they had to discuss a motion of the most important character without having had any means of previously communicating with each other upon it. That state of things might be disastrous, and the crude discussions which might arise in that way would be not at all suitable for publication. From his point of view it would be an injustice to those men who came from long distances if they were to be expected to come there and discuss questions without having the opportunity of considering them first in Committee. The members had every opportunity afterwards of judging what the result was.

Mr. HAMPSON said the last speaker had used the phrase "a few interested parties," and he should like to know what he meant by it.

The PRESIDENT hoped Mr. Hampson would not insist on the question being answered, but he certainly did not gather that Mr. Allen alluded to any members of the Council.

Mr. ATKINS said when he came there he did not intend to speak on this matter at all, and had thought the discussion probably would be a very brief one, but he did not think it would be right not to say a word or two upon it. First of all he wished to pay two compliments to the opposition. He wished to thank the proposer of the motion for his very moderate speech and for the handsome acknowledgment he made at the outset that there was nothing in the Society or its work of which anyone need be ashamed. It was grateful to those who had been working for some years in connection with it to hear that frank acknowledgment from him. He wished also to thank Mr. Watt as a new member of the Council for what he had said. He was not, however, able to give this motion his support, for the following reasons. One of the first things he did, soon after going to that Council, was to do his best to give increased publicity to these proceedings, and most emphatically he joined with others in the desire that the work done should become as widely known as possible. Another thing which he endeavoured to do, and in which he entirely concurred with what had been said was, in not interfering with the convenience of the reporters in asking them to retire, and he should be glad if the President could still further, in the exercise of his judgment, so arrange the business that it might not be needful for them to retire as much as had been the case. But that was a question of expediency to which he would not further refer. The reason why he did not desire to see open reporting carried to the extent which had been described, which would amount to reporting almost the entire proceedings of the Council, was in the first place for his own sake. He came there to form an opinion; he could say most honestly that he came to these questions very frequently with an absolutely unwritten page, so far as his own impressions were concerned, and did his best to listen to the arguments used, to gather up the weight of them, and then to vote in harmony with the judgment he formed upon them. It seemed to him that what their constituents and the members of the craft generally had a right to know was the results. They had a right to know how they voted, and he should always be glad if those votes were distinctly known. He was never ashamed of his vote. In the last instance he happened to be one of the minority of four. He only referred to that in passing, but he should have had no objection to his name being associated with that small minority, or even if it were only one of two. The members had a right to know what were the results of the careful observations and attention to the arguments for and against the question, but they had not a right to know what were the processes of thought through which he had passed and which in committee he might frankly express. It had been his pleasure and great advantage to be able to ask questions in committee, to appeal to all the members one after the other, and so ultimately he came to the final result. He thought they should be protected in the formation of their opinions, and he did not think the trade generally would be benefited by that process being made known. With regard to the question of privilege, it was a most delicate and difficult question. The members of Council dealt sometimes with matters strictly confidential. He did not know whether they were protected by law, but otherwise their statements would sometimes become almost libellous. But they were able in committee frankly to discuss all questions, and to raise points of the greatest nicety without difficulty. He remembered on one occasion in his own town council, one of the astutest lawyers making a slip with regard to some one in his own city. The reporters published it, and an action seemed impending, but it was discovered that he was protected by some statute. He did not know, looking back to the years he had sat on that Council, that he had ever been in the heat of argument entrapped into the expression of anything with regard to either a man or a principle which he had had to withdraw; but he might have been, and it would then have been a fortunate thing for him to be protected by the proceedings being in committee. With regard to himself, therefore, he should claim the privilege of being able to come there and debate the matters in confidence of a committee, and with regard to the country generally, whilst sympathising with all that had been said as to the results of discussion being made known, he thought it would be no advantage to the members at large to know much more than they did at present.

The VICE-PRESIDENT said he agreed entirely with Mr. Watt in not desiring to give a silent vote on this motion, and he might say at once that he intended to vote against it. His reasons for doing so were that he looked upon it as a reflection upon the President as to the manner in which the business had been conducted. It all cropped up out of the business of last month. He did not know that in his experience of the Council, extending over about thirty years, that the right to go into committee when matters of a personal nature were being discussed had ever been a moot question. When any one proposed that the Council should go into committee, he did not know that any objection had ever been raised to a member expressing a reason for not doing so.

Mr. EVANS said that was what occurred at the last meeting.

Mr. HAMPSON said he asked the question, and the President told him that he could not allow of reasons for or against the motion.

The VICE-PRESIDENT said that if it were so it had escaped him, and he would withdraw what he had said. He should like to say a word on the advantages of going into committee. He went with every gentleman in the desire to promulgate by means of the Press anything and everything which could be communicated with advantage to the Society; but, on the other hand, one did like to have it correctly done, and certainly last month he was incorrectly reported as having voted against going into committee, and another gentleman was served the same. He liked to be reported, but he liked to be reported correctly, and surely those who advocated promulgating knowledge throughout the length and breadth of the land by means of reporters should interest themselves also in seeing that the reports were accurate.

Mr. SYMES said that was the fault of the haste with which it was done.

The VICE-PRESIDENT continued. As to the advantage of going into committee, he remembered some twenty years ago being interested in a matter which came before the Council, and on which there were a great many debates; but at length it was found the Council had been spending its time over something which it had no business to deal with—literally that which it had nothing whatever to do with—and the outside members of the Society took the matter out of the hands of the Council. They called a special meeting and said, "We will have nothing to do with it; it is our business and not your business, and we are not going to accept the resolution you suggest to us." On the last occasion the going into committee was not a matter of his devising, for he had prepared an amendment, adverse to the motion which was being brought forward, and was desirous of getting it supported, his objection being to the Council's undertaking that which it had no business to do.

Mr. EVANS asked if the Vice-President was in order in going into these matters.

The VICE-PRESIDENT said he was speaking generally.

Mr. SCHACHT said he would remind the President that Mr. Evans had introduced this matter.

The PRESIDENT said he had no doubt the Vice-President would deal with the matter generally.

The VICE-PRESIDENT said he was doing so. It was within his knowledge that the Council last month was undertaking that which the Society twenty years ago had taken out of the hands of the Council, and he was going to point out in committee that he was not prepared to accept such a position; he would not, however, go further into that matter.

Mr. CROSS said, at the close of the last century, when a distinguished political prisoner met her doom at the guillotine, her last words were: "Oh, liberty! what crimes are committed in thy name." This motion spoke of liberty, but liberty was variously interpreted. He thought it could not be possibly misinterpreted in that room, "That members be at liberty to give reasons for and against all motions to go into committee in like manner as on other motions, and that any standing order contrary thereto be rescinded or modified accordingly." Since sitting at that table he had had the standing orders before him, and he knew of no others, and the President had said at the outset that no standing order on this point existed. It appeared to him, therefore, that although this discussion might have been useful it had been time thrown away, and it was distinctly a crime that they as men of business should be at liberty to waste each other's time by continuing the discussion any further. No member who sat at that table, who brought forward any question which he had a strong conviction should be openly debated, if he were suppressed by the President or by the majority of the Council, would if a man of honour continue to hold his seat. He felt that wherever it was safe to discuss a thing openly, the more openly and publicly it was done the better, but when the standing orders contained no such restriction as the motion referred to, he thought they could neither rescind nor modify what did not exist.

Mr. RICHARDSON said Mr. Symes and Mr. Evans were not the only persons at that table who were anxious to advocate as much publicity in reporting as possible. He held similar views when he first came on the Council, that the reporting was not so full as it ought to be; but he had come to the conclusion from ten or twelve years' experience that there was quite as much reported as was necessary for the Society and for the benefit of their constituents. That was not a public assembly like the House of Commons, or a Board of Guardians; it was practically an executive body to carry on the business of the country. If it were to be a deliberative assembly in that room every month all the work must be done days and days before the meeting. It would be impossible for members of Council to discuss every possible matter and have the reporters present to take all that was said if they were to perform their executive duties as well. No doubt when the President spoke he would knock the cobwebs away, and put the matter clear, but, in his opinion, their main business was executive work, and if they were to have these long discussions by orators from Wales and from Liverpool they would not find men of business would come to the Council. They had seen the result of this continual verbosity in the House of Commons, and a similar result would follow there if the same course were adopted. He remembered some few years ago at Leicester the Bishop of Peterborough was endeavouring to get together a committee, and it was suggested that several gentlemen who had nothing to do would be excellent members. "No," said the Bishop, "I do not like gentlemen of leisure. I like men of business, business-like men, they are the men to conduct business in an expeditious manner." If this motion passed there would be no end of chatter and talk, and the business would never be got through. No one was more anxious than he that everything necessary to go to their constituents should be as fully reported as possible; but they knew very well what occurred with the increase of journalism. The conductors naturally liked to have as much as possible to put into their papers, and he had no doubt this question had been proposed to-day in the interests of journalism.

Mr. EVANS rose to order, and assured the Council that it was not so.

Mr. RICHARDSON said they had seen the painful results of the exuberance of journalism in America, over the incident connected with Lord Sackville, which nearly created a war between two great nations. He knew something about journalism and could understand the desire to have as much matter as possible, but whether it was for the good of their constituents to publish everything was a different question, and he should certainly oppose the motion.

Mr. GOSTLING desired to strongly endorse the opinion enunciated by Mr. Schacht that the Council should always be the judge as to what matters should be discussed in committee, and not the individual who introduced the subject, which might have a beneficial effect on the interests of pharmacy, or might have a prejudicial effect upon the Society. A question might be introduced which might cause division in the Society from Aberdeen to Land's End, and surely it should be not for the individuals who introduced such a matter, but for the majority of the Council to decide whether that should be openly discussed. Such a question should be most carefully considered in com-

mittee before rushing rashly into any discussion whatever. Therefore whatever might have been the reason for the introduction of this question to-day, he was satisfied the Council had been justified in the past, and he must also emphatically endorse the statement made by Mr. Allen that the President was most considerate, and on any question where there was likely to be difference of opinion always put it to the Council. It was quite right also for the Council to decide without discussion or reasons being given on this question of going into committee. Sometimes it would be most difficult to state any reason for going into committee, or against it, without entering into the merits of the question, and if they were gone into why not go into the subject at once. He would just refer to the occasion that morning when the reporters were asked to leave the room, and would ask every gentleman round the table whether it would not have been most undesirable that all that was said then should have been published. Yet it was perfectly necessary that such matters should be discussed. If this motion were passed, the result would be that on a motion for going into committee the speakers would inevitably drift into the question at issue, and therefore the object of the motion would fail. No one would stand up more firmly in favour of free and open discussion than himself, but he said they had free and open discussion. There was nothing withheld from the members which was done by the Council. It was true there were legal matters which would not be proper to report, but as to the general result of their doings, they were all placed before the members at the annual meeting, and discussion was invited on all matters which had taken place throughout the year; and although they now and then had a little warmth of feeling, they generally concluded in perfect harmony, any little roughness having been smoothed away.

Mr. BUTT said he thought everyone would agree that there were times when it was desirable to go into committee, and times when it was not desirable that reporters should be present. The question to be decided was not whether they should not go into committee or not, but whether there should be a discussion on the subject before going into committee, whether twenty-one gentlemen were to talk round that table on every case when it was proposed to go into committee. If that system were adopted it would lead to an enormous waste of time, and there was great difficulty already in getting through the work of the Council in a time which was convenient for some gentlemen to meet their trains. If this course was adopted, two or three days would have to be allotted to the work of the Council every month, and he should certainly oppose the motion on this ground. There was no objection to taking a vote on the matter, but let it be a silent vote, because to discuss the question would open the door to discussing the main question. The only sensible way was to vote in the way which had been followed in the past and which had met with the general approval of the members. Of course, there were certain questions which were taken without a vote simply because they came forward every month, and it was a recognized practice to go into committee on those questions; but on any public question the opinion of the Council was always taken, and it would be distinctly disadvantageous to enter into a long discussion whether the Council should go into committee or not.

Mr. ROBBINS said Mr. Butt had taken the wind out of his sails completely. Mr. Evans did not say, nor can anyone contend, that there were not times when the Council ought to go into committee; and with regard to the standing orders, he did not think there were any standing orders bearing on the question.

Mr. EVANS said he understood from the President at the last meeting that there was a standing order to that effect; but he quite accepted what had been said on that matter, which would probably obviate the necessity for the concluding portion of the motion.

Mr. ROBBINS said it was left free to the Council to determine on each occasion whether it should go into committee or not. This matter had been discussed several times before, perhaps sometimes with a certain amount of acrimony, and it had been decided, not because of a standing order, but as a matter of practice, that it was not desirable, on a motion to go into committee, to discuss the reasons for or against it, because that would open the question in full. He did not see why an attempt should be made to limit the powers of the Council. Was it not better, when the question arose, to let the Council decide at the time? On the last occasion there were perhaps 19 out of 21 members who thought it undesirable that the question then brought forward should be discussed publicly, and, of course, when the President put the question to them they simply said "yes" as a matter of course. Then the President said further, in answer to a question, that there should be no further discussion upon it. He might have left that also to the Council, because there was no standing order against such a motion being discussed; but it had been agreed on several former occasions that the better plan was not to have a discussion on such a question.

Mr. N. H. MARTIN said this matter had been already very fully discussed, and it was hardly necessary to say anything more, but still it might save time in future if members now gave reasons for their votes. It was interesting to a certain extent to reflect a little on who it was who put forward these complaints. Was it from irresponsible journalism and the small army of grumblers, or was it from members of the Society that the complaints came? Then he should like to enquire also what was the ground of complaint. He had lived long enough to feel assured that most Englishmen desired to be reported on all legitimate occasions; they were not afraid to express their opinions, they were not afraid to have them reported, and if one studied the press of this country, it would be found that from the Prime Minister to the humblest vestryman, and from the Archbishop of Canterbury to the latest convert to the Salvation Army, there was no diffidence on the part of Englishmen to be reported; on the contrary, they desired to be reported in full detail—it was the instinct of Englishmen. Every man who held up his hand for going into committee knew at once that he laid himself open to the possibility of being misunderstood by his friends, and to the probability of being misrepresented by those whose interest it was to misrepresent him, and therefore he must have a motive for going into committee. What was that motive? He had put this question to himself, and believed that as twenty-one business men practising their craft, not men retired from business, or millionaires who came there to indulge in academical discussions, but men from Scotland to the south of England, even Wales being represented, met there, and taking their own selfish motives and the interest of the business they conducted, they would go into committee from a good motive, to save time. It might be conceded that they had the interests of the Society at heart in going into committee, and beyond that it might be that they thought of the interests of the craft, and he could not conceive—except upon some such basis as that, that they had the interest of the craft at heart, and that they believed the subjects which had come under discussion had better be discussed *in camerâ*—that any man occupying the chair of the President would force a committee on the Council, or that when members of Council held up their hands for it, they did not believe that in doing so they were not doing the best they could for the craft. Then they were told that in some occult way the interests of phar-

macy were damaged by the private discussions which went on. He should like some of these gentlemen who felt themselves to be apostles and missionaries of education in pharmaceutical matters, those who felt themselves appointed to be the teachers of the great public, to put it to the craft generally that the Pharmaceutical Society was in existence and that it was a factor in everything that concerned the craft. The mass of them could stay outside the Society, and by the inertia of the mass, and the active opposition of the few, could do a great deal of mischief, or they could come inside and do a great deal of good. They could make the Society a most powerful influence for all that was good in connection with the craft if they would do it in, and through, and by the Society, but they would not do it by staying outside and grumbling, and they would not do it by the Council indulging publicly in discussion upon many delicate points which came before it. He agreed in the opinion which had been expressed by one or two gentlemen, that it was not the function of members of that Council to volunteer to educate public opinion, or to make long speeches to be reported, but when once elected they had to come there to transact executive business, and that was frequently done with much greater celerity in committee. He certainly could not support this motion. He was very pleased that Mr. Evans had brought it forward, because it once for all gave an opportunity for giving reasons which would hold good to all future time, why, when a motion was made for going into committee, it should be voted without discussion.

Mr. SOUTHALL said he could not support the motion, and he must say that one of his greatest troubles was from a few gentlemen, and he was inclined to think the long and frequent eloquence which he had to hear that this motion would be an excellent one for assisting those gentlemen to speak over and over again. A great deal had been said about the interest—or rather the lack of interest—taken by the country generally in the affairs of the Society, but he fancied that one of the reasons was that the reports were often very long and perhaps a little dry, and therefore he did not see much advantage in endeavouring to lengthen them.

Mr. NICHOL said he should support the motion because he thought it would tend to shorten discussions. If the members knew that all their speeches were to be reported the speeches would be more condensed. Another reason was that the Council should always have the power of saying what matters should and what should not be taken in committee. No one wished to charge the President with unfair conduct; at least, so far as he had followed his conduct, he thought it had been everything that could be desired; but he thought all should have liberty to express themselves whether they came to the conclusion to go into committee or not. Everything he had heard so far had confirmed him in the opinion that it was very desirable that the motion should pass.

The PRESIDENT said he had not risen before because he thought it as well that the members should have an opportunity of criticising his conduct at all times. He was not at all unaware of the fact that certain gentlemen outside, if not inside, found it useful and, possibly, entertaining to attack him, not always *qua* President, but personally and probably more often personally. But he would say, in the first place, that he did not regard this motion as being any reflection on himself at all, and he was quite sure that they all entertained the desire to feel, if they did not positively feel, at all times that what he did was done to the best of his judgment, and with perfect fairness. But one or two gentlemen, he thought, when they got beaten did not take their beating nicely, and that was a pity. It certainly was not one of the characteristics of the race, but he hoped they would bear this in mind. He had repeatedly himself been out-voted, and had been obliged to come up smiling and propose a series of resolutions or arrangements, or to draft a scheme diametrically opposed to his own views. Now, every member of the Council should feel that he was *in petto* a Chairman or President, and should take a broad view of matters of this sort. He would first reply to Mr. Watt, on what would appear to be, without explanation, a breach of order. He was constantly reported as putting up the flag, and it was a fact that, in regard to certain committees, he did not, nor did his predecessors, go through the formality of asking for a vote, because it was not necessary. It might be useful that the Chairman should always put it formally, but it was a matter of very little moment. Technically, Mr. Watt was perfectly right; there were cases in which his predecessors and himself put up the flag as a matter of course without asking for a resolution; but that was because every month certain reports were always taken *in camerâ*. The discussion of personal matters with regard to the fitness of gentlemen to be members of the Board of Examiners and so on was taken in committee. It was done solely to facilitate business, and not to suit the views of the Chairman; but although he did that it was perfectly competent for anyone to challenge it. When he asked the Council to go into committee, he always said he thought there was a reason for it, and in most cases the Council thought the judgment of the Chairman was sufficient on such a point. When the question came to be discussed a minority—a very small minority—might think it just as well that the discussion should have been in open Council; but if they did, or if any members of the Council when in committee considered it was unnecessary to be in committee, it was absolutely in the power of the Council in committee at any moment to go out again. There was no reason why the members of Council should remain more than five minutes in committee unless they liked. The point he would urge most particularly to Mr. Watt was, that the reason the flag was put up on certain occasions without the question being put was that it was almost as convenient to wait for objections as to put a resolution; but there was no difficulty at all, if anyone wished to raise the question at any time, and in fact he believed he always made the suggestion with a note of interrogation so far as his voice could convey it. He did not want to bind the Council to certain rules and regulations or standing orders. As had been said, they were men of business, and the experience of life had taught him that business was done worst by those who had too many rules and regulations. The next point was also a personal one. It had been laid down by the Council that all matters should be reported except when the Council should resolve on going into committee. In the original regulation it did not say anything about whether the question should be discussed or not, and why? From common sense and no other reason. What Chairman could do otherwise? How could he convince the members that the appeal he was making to go into committee was a substantial one unless he told the whole story, and how could he prevent A B or C going into the whole story? The thing on the face of it was impossible in the first place, and utterly illogical in the next. He remembered calling attention to this when Mr. Greenish was President, and for a number of years it had been the custom, on matters of that sort, in order to get at the sense of the Council without friction or irritation, to take at once a vote upon it. He should not object to do what Mr. Evans wished if he were competent to allow the discussion to go first far enough to allow members to judge of the question before them; but he simply said he could not do it, and therefore he would ask them to reject the motion. The fact of Mr. Evans bringing it forward seemed to him

to indicate that he (Mr. Evans) did not feel the difficulties that any Chairman would have in dealing with a body of 20 gentlemen in regard to it. It was impossible for the Council to be able to do what it wanted, and carry it out without immediately voting upon it. Even supposing an error were committed, supposing the motion was frivolous, the power the Council possessed of going into committee could be at once exercised by another resolution in committee to go out again; in fact, the Council was master of its own proceedings entirely. Mr. Evans admitted the necessity of going into committee, and only wanted the reasons for it to be stated. He probably thought that he (the President) was arbitrary on the last occasion in saying there should be no discussion, but that had been done over and over again for many years, and it was the custom in all public bodies. There was, or had been, a rule in the House of Commons, although he did not think the rules of that House were altogether suited for such a body as that, but still in the House of Commons it was competent for any member to call the attention of the speaker to the fact that there were strangers in the House, and all the reporters were turned out forthwith. The recent discussion on the rules all pointed to the same conclusion, that on certain matters it was desirable to put a motion without discussion. On any subject which had to be discussed in open Council he was probably as well able to take care of himself as anyone else, and probably had more to gain personally, if he valued that sort of popularity which they had heard so much talked about, which arose from making long speeches addressed to the members instead of to the subject before them. But he preferred not to do it, and he hoped they all would get the credit of being men of business who knew not only when to talk, but when to hold their tongues; and that the first business to be done there was the executive work of the Society as a whole. As regarded the effect of reporting on the trade at large, the sort of report that would suit the class of people who grumbled at the proceedings was one which would contain speeches by a number of men promising to do for them something which would materially benefit them. They admitted in many cases that their brethren suffered much, and said they would willingly do much for them, but he desired to say, if the press chose to report him, that nobody was more anxious than every member of the Council who was going to vote against this motion to do all they could to make their life a shade better than it was, and that it did so happen that the best way of doing that was to proceed in committee to gain certain objects; that such objects would be absolutely frustrated by discussing them in public, and that in many cases the interests of the members would be thwarted completely by so doing.

Mr. SYMES: No, no.

The PRESIDENT said he was expressing his opinion and that of those who were going to oppose the motion, not that of those who were going to vote for it. When people talked about being afraid of being reported, he was simply disgusted that it should be supposed that anyone was afraid; but he believed everyone had a conscience, and that he could not discuss in public personal or private measures or negotiations, if there were any, with a Government department, or law measures affecting the interests of men outside the body, but also involving the safety and welfare of men inside the body. He was content to say at once that those things must take place *in camerâ*, and all their interests were best served by so doing. If Mr. Evans, or any of the members who objected to going into committee at any particular time desired to raise the point, he could do so at any time he liked during the progress of the Council. Why did he (the President) occasionally put up the flag in the middle of a speech? Simply to say something which he could not say for publication, in order that every councillor might become as personally cognizant of all he knew as possible. How was it possible for them, gathered from different parts of the country, to know the details which had guided one committee to a conclusion when they had been occupied upon another? He had thought it his duty, as previous presidents had done, to take the whole Council into his confidence, and if matters which were private, or semi-private, came to his knowledge, he had always thought it his duty to let every member of the Council know it. On all these matters there must be some discretion used. Mr. Evans thought on the whole many things were discussed in committee which might be discussed in open Council, and there they were at issue, but he ventured to say that if Mr. Evans remained on that Council and took an active part in its detailed work for twenty years he would come to about the same opinion as the majority of the Council, that the work could be done best in the way in which it was now being done. He should suggest to Mr. Evans, when he replied, whether it would not be wise to withdraw the motion. There was a question whether it was strictly in order, though he would not raise the point; but if Mr. Evans thought it right to divide the Council he must undoubtedly vote against the motion. With regard to the recording of the votes, he might say that time after time when he had put a motion he had not held up his hand one way or the other; he did not think it necessary on every motion that everyone should vote, and in a large number of cases it was not at all necessary that everyone should vote. It often happened that certain members did not do so; not because they had not a view on the measure, but because they did not think it necessary. He might also refer to one observation of Mr. Symes, who had introduced the general subject of reporting, on the objection to the reporters having to withdraw. He had always tried to arrange the business with the greatest consideration for the reporters. Power was conferred upon the President, by resolution of the Council, to the effect that when the Council was in committee the reporters might or might not be asked to withdraw as the Chairman might see fit, and when he asked them to withdraw he did so for their own protection. It would be very evident that, having two gentlemen there connected with trade journals, they might hear what were for the moment secrets which might affect questions in which they were interested, and in their own interest it was much better they should not be present.

Mr. EVANS said he wished in the first place to disclaim any intention to make any personal reflection on the President. He was very glad the few remarks he made were so well received, and he did not think the whole discussion had been carried on in a very bad spirit, except perhaps one remark of his friend from Newcastle, which might have been omitted, but he would pass it by. The President said they had the power to vote on the question of going into committee, but the majority on the Council were so hopelessly in favour of going into committee that he honestly believed if the question were put now whether there should be any Council work at all?—would it not be better to go into committee altogether?—it would be carried. Of course that was a matter of opinion. With regard to the House of Commons he was quite aware that the rules of that House would not altogether suit the Council, but they were well aware that even the committees of the House of Commons were reported.

The PRESIDENT remarked that the committees on public questions were reported, but not on private questions, and the committees of the House repeatedly turned the reporters out; they cleared the room whenever they thought proper.

Mr. EVANS said some remarks had been made about members addressing speeches to popular audiences, and people being afraid to vote, and so on. Nobody wished to discuss personal matters, and he did not ask the Council not to go into committee at all, but simply said, let the Council put a stop to this continuous going into committee without any necessity for it. There was no question about it, the Council went into committee much too often and without sufficient caution. What he was anxious to do in connection with this motion to-day was, if possible, to produce an inclination to go into committee a little less frequently, and that would be a great point gained. He believed the day would come —all minorities believed the same thing—when they would be the majority, and if that time came, he hoped the motto put on the wall would be "free speech and free reports." In the Finance Committee, on the preceding day, he saw an item for printing division list papers, and he asked to see what they were. That was the first time he had ever seen these lists, and two or three other members of the Committee said the same thing. He should like to see those lists put before them on the Council table, and on that particular division to have the names put down, who voted for and who voted against it. There was a great principle involved. Something was said about delegates and representatives, and all that sort of thing; he was not a delegate from anybody, but a representative. With regard to the reporters leaving the room, it was not the question under discussion, and he did not know the circumstances when it was advisable that it should be done, but it ought not to be the rule, but the exception. If there were any matter affecting the interests of those whom they represented, it was only fair they should be asked to leave the room, but it should always be remembered that reporters were gentlemen, and were expected to know how to behave themselves. When ordinary matters were discussed, such as cropped up month after month, it was only fair that they should not be asked to retire, but only when something personal occurred. The question was whether there should not be more reporting than at present. Those who agreed with him thought they would lessen the evil complained of—namely, the lack of interest taken in the Society—by reporting more. Mr. Schacht said he did not take any part in the last division; but he certainly thought a gentleman of his experience and knowledge, holding the liberal views he generally did, ought to have formed an opinion, and shown the younger members what course they ought to take. He was glad to find that Mr. Watt was sound in the faith, and had expressed such liberal views. Mr. Allen had said that he did not follow anyone like a sheep, and of course he acquitted him of any such thing, and for his part he was not one of the driven cattle; each man had a right to do as he pleased. He had not accused anybody of anything of the sort, but he would remind him that sometimes influence was exercised unconsciously. There was a certain animal called a fox, which would go round and round the tree on which the birds were roosting until the pheasant was so bewildered by watching him that it dropped into his mouth, and so people might be influenced without being aware of it. Mr. Atkins said he came there to form his opinions, because members could not communicate with each other. He did not see the necessity of writing from one part of the country to another to know what their views were. He came from the most uncivilised portion of the country with a mind formed on every question which was brought before him, and if he was not prepared to give an opinion upon it, he was prepared to move that it be adjourned for a month, until he had time to consider it. There was always three days' notice of the business coming forward, and if gentlemen had not had time to consider it it was their duty not to go into committee, but to move that it should be adjourned to the following meeting, and then it might be discussed in committee on the Tuesday, and brought up in open Council on the following day. In conclusion, he might say that if the gentlemen who supported him wished him to withdraw the motion he would do so, but if not he would take a division.

Mr. MARTIN said it had been publicly stated in two or three papers that if there had been a matter discussed in committee it could not then, or after that, be discussed in public. He wished to know whether that was so as a matter of fact.

The PRESIDENT said no. The Council, after it had considered a question in committee, was in a position to report at once, and discuss that report as openly as it chose.

Mr. EVANS said if he had not been allowed to address the Council to-day, he should have communicated his views to the press.

Mr. SYMES said the question was this—if he were present when a matter was discussed in committee, had he any right to go and make that public?

The PRESIDENT said, of course not, but it would be open to the Council to discuss it.

Mr. HAMPSON said the discussion had been valuable, but he scarcely thought it necessary to go to a division. The motion was addressed distinctly to one point, but the discussion had been somewhat outside of it.

Mr. WATT expressed a wish that a vote should be taken.

Mr. BUTT claimed, according to the bye-law, subsection 2, section 6, that the vote be taken by ballot.

The PRESIDENT said if Mr. Butt persisted in demanding a ballot he had no alternative.

After a short discussion the motion was withdrawn.

FEES AT EXAMINATIONS.

The PRESIDENT said a letter had been received from a member, asking whether his son could be allowed to enter for the Preliminary examination in January on paying the reduced fee, he having been unable, on account of illness, to present himself for examination in October, for which he had paid the fee, and having first failed in January last.

Mr. SYMES explained the circumstances of the case, and said that, according to his view of the by-laws, the Council had a discretion to allow this reduction to be made.

The PRESIDENT explained that similar cases were constantly occurring, and that both to his own view and that of the solicitor, the only discretion in the Council was as to the excuse alleged being a valid one. If that were the case, the student was allowed to present himself again within a year from the time when he paid the full fee, on payment of a nominal fee. In the present case the time limit would be exceeded, and that had always been held to be beyond the discretion of the Council to allow.

GENERAL PURPOSES COMMITTEE.

The minutes of this Committee included the solicitor's report on cases which had been placed in his hands. Two defendants had paid penalties before trial, and another had paid four instalments of a penalty. Other cases were in progress.

Several other cases of alleged infringement of the Pharmacy Act had been considered by the Committee, and proceedings recommended.

The Council as usual went into committee to consider this report.

On resuming, the report and recommendations were unanimously adopted.

CORRESPONDENCE.

The following correspondence was then read:—

Letter from Mr. T. S. Dymond, expressing the

thanks of the Council of the Chemists' Assistants' Association for the loan of microscopes for the purposes of a conversazione.

Letter from Mr. C. B. Ford, secretary to the North of England Pharmaceutical Association, conveying the thanks of the Council of that Association for a copy of the 'Calendar' and the current issue of the *Pharmaceutical Journal*.

GENERAL MEETING—BENEVOLENT FUND

ELECTION OF ANNUITANTS.

A General Meeting of the Members, Associates in Business, and Associates of the Pharmaceutical Society and of the Subscribers and Donors to the Benevolent Fund, was held at the house of the Society, 17, Bloomsbury Square, on Thursday, December 6, at 12 o'clock, for the election of THREE ANNUITANTS.

Mr. ALEXANDER BOTTLE, Vice-President, in the chair.

The notice convening the meeting was read.

Scrutineers were appointed, who examined the voting papers and brought up the following report:—

Scrutineers' Report.

We, the undersigned Scrutineers, appointed at the twenty-fourth election of Annuitants on the Benevolent Fund of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us, and report the following result:—

Jones, Augusta	5077
Chapman, Richard John	3843
Stevens, Elizabeth Johnson . . .	3730
Edwards, Hannah C.	3302
Mumbray, Henry George	3039
Spendelow, Mary E.	2895
Brown, Eliza	1120

3825* voting papers were received, of which number 72 were informal (44 unsigned, representing 138 votes, and 28 incorrectly filled up, representing 90 votes) and were disallowed.

W. K. HOPKIN, *Chairman.*

EDWARD N. BUTT.	WM. ARKINSTALL.
WALTER HILLS.	W. FRED. GULLIVER.
T. HOWARD HALL.	WM. LLOYD WILLIAMS.
EDWARD M. BURDEN.	W. H. SYMONS.
W. TOOGOOD FROST.	A. W. GERRARD.
ROBT. SAML. BATHE.	A. E. TANNER.
THOS. HENRY POWELL.	FRANK TUPHOLME.
HENRY C. BIRCH.	J. H. THOMAS.
CHARLES B. ALLEN.	EDWARD B. STAMP.
R. S. DAMPNEY.	SIDNEY CONSTANCE.
H. BATE.	W. R. DODD.

December 6, 1888.

The VICE-PRESIDENT called attention to the number of voting papers that had been disallowed by the Scrutineers in consequence of the erroneous manner in which they had been filled in. He said that some of the voters seemed to be under the impression, notwithstanding the instructions were very plain, that they could give the total number of the votes to which they were entitled to as many candidates as they pleased.

The VICE-PRESIDENT then declared the following three duly elected Annuitants:—

Jones, Augusta.
Chapman, Richard John.
Stevens, Elizabeth Johnson.

On the motion of the VICE-PRESIDENT, a vote of thanks was awarded to the Scrutineers for their services.

On the motion of Mr. ALLEN, a vote of thanks was also given to Mr. HOPKIN, who had acted as Chairman of the Scrutineers.

* 5883 voting papers issued.

General Medical Council.

The following is taken from the official minutes of the meeting of the General Medical Council, on Monday last, December 3:—

REPORT BY THE PHARMACOPŒIA COMMITTEE.

The Pharmacopœia Committee begs leave to report that 26,200 copies of the British Pharmacopœia of 1885 have been sold, the estimated profit from this source in favour of the Council being £1,300.

It has been found necessary, in consequence of the stock in hand being nearly exhausted, to order a reprint of 3,000 copies, which is now being issued.

Advantage has been taken in issuing this reprint to restore the synonyms of Paregoric Elixir and Paregoric for Tinctura Camphoræ Co. and of Laudanum for Tinctura Opii. A complete list of the alterations and corrections which it has been found necessary to make in the three reprints issued has been prepared, and may be had gratis on application to the Registrar at the office of the Council, or to the printers of the Pharmacopœia—Messrs. Spottiswoode.

The Committee having considered a statement of the solicitor as to the authority of the British Pharmacopœia, which they now submit to the Council, resolves to recommend to the Council that the subject of the new clauses suggested should be placed in the hands of the President of the Council, the Chairman of the Committee, and the Solicitor, with the view of taking such steps as they may find to be necessary to obtain the required amendment of the law.

RICHARD QUAIN, M.D.
May 28, 1888. *Chairman.*

STATEMENT AS TO THE AUTHORITY OF THE BRITISH PHARMACOPŒIA.

Inasmuch as it is of the utmost importance that the preparation and composition of drugs used in the treatment of disease should be accurate and uniform in composition according to a fixed standard, such as that long established by the Pharmacopœias published in Great Britain and Ireland:—

And whereas questions have arisen as to the mode in which the authority of the British Pharmacopœia now substituted by Parliament for the Pharmacopœias previously in use can be legally enforced as the standard for drugs, poisons and compound medicines, the solicitor to the General Medical Council has been instructed to prepare a statement, showing concisely, firstly, the manner in which the British Pharmacopœia has become such standard, and, secondly, the modes

by which the public and medical profession are statutably protected against the infringement of its authority.

Statement.—A charter was granted by 10 Henry VIII. (1518) to the College of Physicians entitling the members thereof to practise in London and seven miles round, and the supervision and scrutiny of every kind of medicine and prescription within that district was confided to the College, and offences were to be punished by fine and imprisonment.

By 14 and 15 Henry VIII. c. 5 (1523), the charter was confirmed.

By 32 Henry VIII. c. 40 (1540), power was given to the College to enter the houses of all apothecaries within their precincts to search for and to examine the state of their drugs, and to burn all defective wares then found, with a penalty of £5 for any recalcitrance on the part of the apothecaries, half to the Crown and half to the informant. These penalties could be enforced by the College.

By 1 Mary, sess. 2, c. 9, sec. 5 (1554), further powers were given for the searching for "poticary wares, drugs, and compositions," and "for the punishment of the poticaries for any their evil and faulty stuff." The College could send offenders to any prison except the Tower, and the warders were enjoined under heavy penalties to keep the prisoners at the prisoners' cost until discharged by the College.

The first London Pharmacopœia was published in 1618. In 1585 the work was in hand, and is referred to in the annals of the College as a work "in hac civitate ab omnibus pharmacopolis usurpandâ."

The King's proclamation commanding all apothecaries of the realm to follow this Pharmacopœia is dated April 26, 1618. Nine pharmacopœias have since appeared, and each was issued under the authority of like Orders in Council.

By the last Order in Council dated February 3, 1851, Her Majesty commanded all apothecaries, etc., in England, Wales, or Berwick-upon-Tweed, not to compound medicines, etc., except in accordance with the Pharmacopœia Collegii Regalis Medicorum Londonensis, and directed the punishment of offenders according to law. This Order, though as stringent in terms as words could make it, has not the effect of an Act of Parliament in the imposition of penalties, but it clearly shows the intention of the Legislature to establish the Pharmacopœia as the standard.

By the Medical Act, 1858, sec. 54, the General Council were directed to prepare and publish the British Pharmacopœia.

By the third section of the Medical Act, 1862, it is enacted that "the British Pharmacopœia, when published, shall, for all purposes, be deemed to be substituted throughout Great Britain and Ireland for the several above-mentioned Pharmacopœias (*i.e.*, the Pharmacopœias in use in England, Scotland and Ireland), and any Act of Parliament, Order in Council, or custom relating to any of such last-mentioned Pharmacopœias, shall be deemed after the publication of the British Pharmacopœia to refer to such Pharmacopœia."

Notice of publication of the Pharmacopœia was inserted in the London, Edinburgh, and Dublin Gazettes as the Statute directed.

The British Pharmacopœia is thus established as the legal standard.

The Pharmacy Act, 15 and 16 Vict., c. 56 (1852) incorporated the Pharmaceutical Society, and regulated the qualification of chemists. By Section 12 it imposes a penalty on unqualified persons setting themselves forth as chemists, such penalty to be recoverable by the Registrar of the Pharmaceutical Society, under the authority of the Council of that Society. This Act was amended by the Pharmacy Act, 1868, 31 and 32 Vict., c. 121. By it unqualified persons were not to act as chemists, and all chemists were to be registered and to conform to the regulations of the Pharmaceutical Society so far as the sale, etc., of poisons is concerned.

By Section XV. it is enacted that any person who should compound any medicines of the British Pharmacopœia, except according to the formularies of the said Pharmacopœia, should be liable to a penalty of £5, such penalty to be recoverable in the manner provided by the Act of 1852, in which it is enacted that the Registrar of the Pharmaceutical Society shall be the person to recover the penalties as above mentioned.

This Act does not extend to Ireland.

By an Act 1 Geo. III. c. 14 (1760), intituled "An Act for preventing frauds and abuses in the vending, preparing, and administering drugs and medicines," the College of Physicians in Ireland were directed to frame a Pharmacopœia which was to be followed and observed by all apothecaries, chemists, druggists, and other persons who should prepare, administer, sell, expose, or keep to sell any drug, compound, medicine, or chemical preparation whatsoever throughout the kingdom, and the penalty for breach of its provisions was £10, recoverable summarily.

By an Order in Council of the Lord Lieutenant of Ireland, dated August 22, 1850, after reciting an Order of April 29, 1826, whereby apothecaries, &c., were directed to compound medicines in accordance with the Pharmacopœia when published, and notifying that the Pharmacopœia was ready to be published, it was ordered that all apothecaries, &c., in Ireland should after the publication compound medicines, &c., in no other manner or form than was directed in the said book.

By an Act 31 Geo. III. (1790), intituled "An Act for the more effectually preserving the Health of His Majesty's subjects, for creating an Apothecaries' Hall in the city of Dublin, and regulating the Profession of an Apothecary throughout the Kingdom of Ireland," it was enacted that no person should open shop or practice the art or mystery of an Apothecary in Ireland until he had been examined as to his qualification and knowledge of the business, and should have received a certificate from the Apothecaries' Hall, Dublin, under a penalty of £20, recoverable by the Apothecaries' Hall, Dublin.

The Food and Drugs Act, 23 and 24 Vict. c. 84 (1860) directs (Section 1) that a penalty of £5 shall be recoverable by summary conviction against persons adulterating food or drink. The Act applies to the United Kingdom, but is practically superseded by the Food and Drugs Act, 1875.

By an Act (Irish) 33 and 34 Vict. c. 26 (1870) the sale of poisons in Ireland was regulated, and by Section 3 the provisions of the Food and Drugs Adulteration Act, 1860, were extended to articles sold as medicines, the penalties being recoverable by summary conviction.

The above Acts of 1 and 31 George III. and Orders in pursuance of them were practically superseded, so far as the sale of drugs and the registration of druggists are concerned, by an Act of 38 and 39 Vict. c. 37 (1875), (Ireland) whereby the Pharmaceutical Society of Ireland was constituted.

By Section 30 it is unlawful for any but a druggist in business before the Act of 1875 came into operation, or a registered apothecary, or a pharmaceutical chemist, to sell poisons within the meaning of the Act of 1870, and any person acting in contravention of the enactment, or compounding any medicine of the British Pharmacopœia, except according to the formularies of the Pharmacopœia, is liable to a penalty of £5, summarily recoverable (Section 36).

By Sections 6 and 7 of the Food and Drugs Act, 1875, no person shall sell, to the prejudice of the purchaser, any drug or compounded drug not of the

nature, substance, and quality of the article demanded by such purchaser, under a penalty of £20.

By Section 20 penalties are recoverable as prescribed by 11 and 12 Vict. c. 43, *i.e.*, summarily.

The Scottish Pharmacopœia was published by the Royal College of Physicians of Edinburgh. The work, established by custom, had no formal legal sanction.

The Pharmacy Act of 1868 does not extend to Ireland, which has its own Act of 1875, as previously mentioned.

The authority of the Pharmacopœia as the standard having been thus shown by various legislative Acts and Orders in Council, the next point for consideration is, how penalties for infringing its formularies can be most readily enforced.

The Acts directly or indirectly relating to the sale of drugs, etc., now in force are:—

1. Directly. The Medical Act (1862), whereby the British Pharmacopœia was substituted throughout Great Britain and Ireland for all the Pharmacopœias theretofore in use in England, Scotland, and Ireland.

2. Directly. England and Scotland, 31 and 32 Vict. c. 121 (1868). The Pharmacy Act, setting up the Pharmacopœia as the standard, the penalties being recoverable by the Pharmaceutical Society only.

3. Directly. Ireland, 38 and 39 Vict. c. 57 (1875). Irish Pharmacy Act, setting up the Pharmacopœia as the standard. Penalties recoverable summarily.

4. Indirectly. United Kingdom, 38 and 39 Vict. c. 63 (1875). Food and Drugs Act, though not setting up the Pharmacopœia in terms as the standard. Penalties recoverable summarily.

As the Food and Drugs Act 1875 does not refer in terms to the Pharmacopœia, some magistrates have refused to convict under it, in cases where the drugs delivered have been sold as being according to the prescriptions of the Pharmacopœia, but have been proved not to have been compounded in accordance with such prescriptions.

There is thus much confusion, inconvenience, and danger in the law as it stands, both because the Pharmacopœia, which is made the standard under Orders in Council and various Acts of Parliament, and under the Pharmacy Acts, is not stated to be the standard under the Food and Drugs Act. Thus, whilst penalties can be summarily recovered in Ireland, they can only be recovered in England and Scotland through the action of the Pharmaceutical Society.

In England and Scotland the interests and safety of the public and the medical profession could and should be more completely provided for by adding a clause to any Act of Parliament bearing on the subject enabling penalties under the Pharmacy Act to be recoverable summarily, as they are in Ireland. This would not interfere with the independent action of the Pharmaceutical Society.

The Society can have no wish to prevent persons injured by fraudulent chemists or others from having a ready legal remedy. Nor would the fact that the public analyst, the sanitary authority, or, indeed, any person injured, had power to proceed independently, hinder the Society from taking action in cases where it was called upon or thought fit to do so.

In Ireland the penalties are recoverable, as it is submitted they should be in England and Scotland, summarily.

In any amendment of the Food and Drugs Act it would be desirable to declare the British Pharmacopœia to be the standard for drugs, compounded medicines, and the like, the omission of such declaration having arisen solely from the assumption that as it was the standard under the Pharmacy Acts, so it would necessarily be the standard under the Food and Drugs Act.

To summarise, I advise:—

1. That the English and Scottish Pharmacy Act should be brought into harmony with the Irish Pharmacy Act by inserting in the Pharmacy Act now before Parliament a clause amending the Pharmacy Act of 1868, and directing that the penalties under that Act should be recoverable summarily.

2. That the Food and Drugs Act should be made consistent with the Pharmacy Acts by declaring the British Pharmacopœia to be the legal standard, acknowledged as it has been so amply and for so long a time under Orders in Council and Acts of Parliament, by a clause or words to that effect in the proposed amended Pharmacy Act.

November, 1888. FREDK. WILLIS FARRER.

Pharmacy Acts Amendment Bill.

New Clauses suggested by Mr. Muir Mackenzie.

Page 2—After Clause 3, Pharmacy Act, 1868, insert the following new Clauses:—

Notwithstanding anything contained in the Pharmacy Act or the Pharmacy Act, 1868, or this Act, every penalty under the fifteenth section of the Pharmacy Act, 1868, or under this Act, may be recovered before a Court of Summary Jurisdiction in the manner directed by the Summary Jurisdiction Acts as if it were a penalty for an offence punishable on summary conviction.

The expression "Summary Jurisdiction Acts" in Scotland means the Summary Procedure Act, 1864, the Summary Jurisdiction (Process) Act, 1881, and any Act or Acts amending the same.

For the purposes of the Sale of Food and Drugs Act, 1875, and any Act amending or extending that Act, the British Pharmacopœia, published under the Medical Acts, shall be the standard for determining the composition of drugs and medicines; and any drug or medicine sold as being one of the drugs or compounded medicines of the British Pharmacopœia shall not be deemed to be of the nature, substance, quality, and ingredients demanded by the purchaser of such drug or medicine unless the same has been compounded in accordance with the formularies of the British Pharmacopœia.

Pharmaceutical Society of Ireland.

SPECIAL MEETING OF THE COUNCIL.

On Monday, November 26, a special meeting of the Council, convened by the President, was held at No. 11, Harcourt Street, Dublin, at three o'clock, for the purpose of "considering communications from Messrs. Clay and Close, relative to the Pharmacy Act Amendment Bill, and of deciding on the future conduct of that measure." The chair was taken by the President, Mr. J. E. Brunker, M.A.

The other members of the Council present were the Vice-President (Mr. Draper), Mr. Hodgson (Treasurer), Dr. Pring, Messrs. Allen, Beggs, Grindley, Charles Evans, Wells, McCormack, Minchin, Doran, Professor Tichborne, Simpson, Hayes and Dr. Montgomery.

The President said he had to thank the members for having responded so numerously to his invitation, as their votes that day would mark a turning point in the history of the Society. He had had a voluminous correspondence with Messrs. Clay and Close, of which, however, it was only necessary to give them the heads. On November 18 Mr. Close wrote, saying that he had seen Mr. Madden, the Solicitor-General, who had expressed grave doubts as to whether the Bill could be

taken in the present session. On the 12th Mr. Close wrote, saying that it might be well, if possible, to arrange that the Bill should be taken next session, rather than run the risk of having to begin again *ab initio*. He (the President) wired to Mr. Clay to make such an arrangement if he should find it advisable to do so. Mr. Close, however, found that it would not be advisable to do so, and that it would be better to try to get the Bill through if possible in the present session. On the 15th Mr. Clay wrote to say that the opposition to the Bill was very strong, and suggested that there should be a meeting of the supporters and the opponents of the Bill. To that he (the President) replied, suggesting, on his own responsibility, that there should be a postponement for a fortnight, provided it did not spoil the chance of a further postponement to next session, should that be deemed desirable. In reply he got a letter on the 19th saying, that without some agreement being come to between the parties there would be no chance of the Bill passing this session. On receipt of that letter he made up his mind to call the present meeting; and he wrote stating certain amendments which he said he would ask the Council to accept. Anyone who had followed the course of the fight in this matter would give him credit at all events for having loyally stood by the majority of the Council in trying to carry out their views. Others who agreed with him had also sunk their own opinions; so that he did not claim any special credit in the matter. However, he was now prepared to bow to the inevitable and to ask them to do the same. It was perfectly evident from the opposition which had lately sprung up that they could not carry their Bill unless they gave way in one or two important particulars. On the 20th he wrote forwarding the amendments which he was now about to submit to the meeting, with a request that they should be laid before Sir James Corry as the basis of an agreement suggested by himself, not pledging the Council to the acceptance of them; and he received a reply stating that Sir James Hazlett would be in London on the following Tuesday, and asking if he (the President) could make it his convenience to leave for London on that (Monday) night. Now as to the amendments which he would ask the Council to accept. The two points which he conceived should be the basis of any agreement were the perpetuation of the grade of druggists and the elimination from the Bill of the objectionable 13th clause. The perpetuation of the grade of druggists would be accomplished by altering clause 6 so as to make it read as follows:—"Every person who has practised as chemist and druggist, or chemist or druggist on his own account in Ireland, and styling himself as such between the 11th day of August, 1875, and the passing of this Act, and every person who has been an assistant or apprentice who has duly completed a term of service as such of not less than four years under a person who shall have become a registered druggist under this section, or who shall have been registered under the preceding section, shall be entitled to be registered as a druggist under this Act on complying with the following provisions, etc., as in Bill, removing the dates." The practical effect of these amendments would be that any person who had gone into business as a chemist or druggist since the Act of 1875, could be registered on complying with those conditions. The registration of chemists or druggists actually in business was confined to those who had gone into business between 1875 and the passing of the proposed Bill into law; but for the future, as well as in the past, under the section as proposed to be amended, all persons who shall have served a four years' apprenticeship to a person who was a registered druggist, would be entitled to be registered on the same terms as were prescribed for druggists in business during the period he had mentioned. He thought it would be advisable to have a new schedule for the amended section, and a provision that a declaration should be made by the master of the apprentice seeking to be registered.

Mr. Pring: In case of the death of a master?

The President: That can be provided for in the same way as in our existing regulations, viz., that when an event of that kind occurs, the apprentice may be handed over to another master, and the periods he had served under each combined. At present the Bill only provides for a declaration from the apprentice that he has served four years; but I think there should be a confirmatory declaration from the master. I wish now to take the sense of the Council as to whether this very large surrender is to be made. I am disinclined to say much on the subject, for you know what my opinion about it is. The last time a vote of the Council was taken on it was in March, 1884, and on that occasion a majority were opposed to perpetuating the grade of druggists.

The Vice-President: What was the majority?

The President: It is not recorded.

Mr. Wells: One voted in favour of perpetuation.

The President said it was perhaps just as well that they should not now go into that. He thought that the acceptance by the Council now of the amendments proposed would probably beat down all opposition to the Bill; and if it should be passed, the Society would be placed in a very favourable position.

Mr. Pring: I had a long interview with Sir James Hazlett on Saturday, and he said it was a *sine quâ non* with those whom he represented that they should have the two grades—that they would not accept any compromise otherwise. He is also anxious that the title should be "chemist and druggist" instead of "druggist."

The President: We will deal with that afterwards.

Mr. Simpson: There will be really very little difference between them, for all after a certain date will have to come up for an examination that no one but a pharmaceutical chemist would think of undergoing.

The President: I don't agree with you there at all. It is an extremely simple examination that has been provided for this grade. That question was raised by a correspondence some time ago, and I found it necessary to write a letter explaining my view of the examination. I do not think anyone would say that it is too difficult. My view of the examination was accepted by Mr. Rankin in his letter in reply to mine, as setting forth an examination that would not be too severe. The President read from his letter the requirements of the examination, which, he said, included ability to write English dictation without serious lapses in orthography and grammar; knowledge of the rules of arithmetic to the end of vulgar fractions, and of British weights and measures, and an elementary knowledge of chemistry sufficient to enable the person to apply intelligently the usual tests for drugs and poisons—such, in fact, as would enable him to distinguish sulphate of zinc from epsom salts and tartar emetic from cream of tartar.

Mr. Hayes: I would like to move that the matter be left in the hands of our President, and that he be not tied down to certain clauses of the Bill only.

The President: I think so important a question as that of the perpetuation of the grade of druggists should be dealt with by an actual vote of the Council.

Mr. Wells: As one of those who have taken a very active part in opposing the perpetuation of the druggists, I would now give way; but I do not do so because I have any reason to think that the action we have taken in the matter was mistaken. I believe still, as I have believed all along, that to have only one grade would be for the benefit of the country; however, seeing the difficulties there are in the way of that, I am prepared to vote for the amendment pro-

posed, but on the understanding that upon the point which Mr. Pring mentioned a moment ago the other side should give way. But if they insist on the title "chemists and druggists," I do not see my way to yielding the other point.

Mr. Hayes moved:—

"That it be left in the President's hands to arrange with the opponents of the Bill as to the withdrawal of the clause against the perpetuation of druggists."

Mr. Pring seconded the motion.

The Vice-President: I do not think that is strong enough. We should say that this Council adopts the principle of the perpetuation of druggists.

Mr. Wells: We should say that we are prepared to surrender on something being given to us.

The Vice-President: Are you going to send Mr. Brunker to London without any power whatever?

Mr. Doran: Vote for the perpetuation of druggists and come to the other points afterwards.

Mr. Hayes moved—

"That this Council agrees to accept clause 6 of the Bill as amended by the President, and admitting the principle of the perpetuation of registered druggists."

Mr. Pring seconded the motion, which was put from the chair and unanimously agreed to on the motion of Mr. Simpson, seconded by the Vice-President. The other amendments were considered in committee.

The Council having resumed,

Mr. Hodgson moved—

"That full authority be given to the President to arrange all details of the Bill at the meeting proposed to be held in London."

They had unanimously adopted the principle of perpetuation. There were a number of little details with respect to which he knew that the President would use his utmost influence for the advantage of the Society; and he had the most complete confidence in his capability of meeting those gentlemen and getting the best terms he could for the Society. Therefore they ought to give him a *carte blanche* as to those details.

The Vice-President said he seconded the motion with all his heart, because he believed it was the only course they could adopt.

The motion of Mr. Hodgson was then put and carried unanimously.

The Council then separated.

Provincial Transactions.

LEICESTER AND LEICESTERSHIRE CHEMISTS' ASSOCIATION.

The annual distribution of prizes and conversazione in connection with the above Association took place in the Co-operative Hall, Leicester, on Wednesday evening, November 28. The spacious room was arranged so as to make a plentiful display of scientific instruments and objects of interest. Messrs. J. Richardson and Co. had a large exhibit in front of the platform under the care of Mr. G. Ward. This firm showed a number of new and rare drugs, large specimens of caffeine in crystals, also a number of very handsome medicine chests and emergency cases. Mr. H. Pickering had a large table full of electrical apparatus, vacuum tubes, incandescent lamps, etc., which were shown at work during the evening. The Association also sent a number of interesting objects from their rooms. At another table there were a number of large microscopes with living objects on view. These were lent by Messrs. Hancock, Lloyd, Burford, Ward, Garratt, and Edwards.

Messrs. J. Richardson and Co.'s reed band, under the able direction of H. N. B. Richardson, Esq., B.A., played a number of selections during the evening.

There was a very numerous gathering of ladies and gentlemen present, amongst them being Dr. J. H. Neale, M.D., G. C. Franklin, Esq., F.R.C.S., J. G. F. Richardson, Esq., J.P., F.C.S., President of the Association; and Miss Richardson, Mr. and Mrs. Young, Mr. and Mrs. J. Burn (Abbey Park), Mr. and Mrs. W. Rowe, Mr. and Mrs. G. Woolley, Mr. and Mrs. R. Broof and Miss Broof, Mr. and Mrs. Thirlby, Mr. Plowman, Mr. S. F. Burford, F.C.S., Mr. H. Pickering, Mr. and Mrs. J. J. Edwards, Mr. E. H. Butler, Mr. and Mrs. W. B. Clark, etc., etc.

Letters of apology were received from the Mayor, Ald. Wood, Rev. J. Went, M.A., Rev. E. Atkins, B.Sc., A. W. Poyzer, Esq., B.Sc., Drs. Crossley, Bond, Bennett, Pope, Douglas, Barlow, Okell, Mr. Councillor Mott, F.G.S., Mr. Franks, F.R.A.S., and Mr. Davis (Nottingham).

Prior to the formal business of the evening—

Mr. Edwards (Hon. Sec.) remarked that he had been requested to perform a very pleasing and agreeable duty. It often was said that gratitude was a very rare virtue in the young, but as far as the young men connected with that Association were concerned, such was not the case. As all present were aware, Mr. Richardson had done a great deal for them in furthering the objects of the Association, and providing the "wherewithal" to carry on and organise classes for their benefit. On an occasion like the present, the first in the annals of the Association, the young men decided in some signal manner to shew their appreciation of Mr. Richardson's kindness, and had organized a small present which would be a surprise to him, as it certainly was to himself (the speaker). This was perhaps one of the most graceful acts which he had ever been called upon to perform in his life, namely, to represent the young men in their outburst of thankfulness for Mr. Richardson's kindness. In conclusion, he asked Miss Richardson's acceptance of the accompanying bouquet. Mr. Edwards then introduced Miss F. M. Clark, who, on behalf of the assistants and apprentices, presented a splendid bouquet to Miss Richardson, who smilingly bowed her acknowledgments.

The President, who was cordially received, assured the company that he simply expressed his daughter's feelings when he told them how grateful she felt on receiving that magnificent bouquet. He himself could not have thought of a more appropriate gift, by reason of her passionate fondness of flowers. Although the flowers might fade, he was sure the remembrance of that event would never fade from her memory. On her behalf, he begged to thank the young men for their very kind appreciation of himself.

In taking the chair as President of the Association, the agreeable duty devolved upon him of offering a few remarks on the opening of the session for the ensuing year. He would remind them in the first place that this in reality was not a new association. He believed as early as 1869 an association was formed not by the chemists themselves, but by the chemists' assistants in the town, and they were ably assisted by many gentlemen who, he was happy to say, were still very much interested in pharmacy and pharmaceutical education. He did not at that time take a part in the Association, because he did not quite approve of the course adopted, though he admitted that the Association had done most excellent work, and formed a splendid forerunner of the new Association, of which he had been made the first President. It was his belief at the time that the old Association should have been formed on a basis so as to include, not only the assistants and apprentices, but the principals of the whole county, but in this he was overruled. He was glad to witness the formation and growth of the Association, and he had rendered it every possible assistance, not only in Leicester, but as a member of the

Council in London; still, when two years ago, a deputation waited upon him and asked him to assist in resuscitating as it were the old Association by starting the new one, he felt a reluctance, owing to business engagements and other collateral matters. Nevertheless, he could not resist the pressure brought to bear by Messrs. Edwards, Burford and Thirlby, and thus he consented to try whether they could not reorganize the old Association and put more life into it by infusing some of the "old blood" of the chemists of the town and county. He was happy to say this had been achieved with great success. They had held enthusiastic meetings and gatherings, and what was called "the opening of the session," but the latter had never assumed so grand an aspect as on the present occasion. He felt, especially from the attendance of the ladies, that the Association was on the high road to success. He would have experienced considerable diffidence in addressing that gay assembly but for the fact that at the examinations and meetings in London he had been brought in contact with ladies who sympathized with pharmacy. There were at the House of the Society in Bloomsbury Square many ladies who had adopted pharmacy as a profession, and they were by no means second to the other sex in ability and determination to conquer all difficulties. Although they in Leicester had made a commencement in that "meek and modest" way, he thought their Association would bear comparison with most Associations throughout the country, for although theirs was in a state of prosperity, and every day greater enthusiasm was manifested in every branch of the Society, he was sorry to see that in some large centres they were constrained by experience to believe that chemists' associations in the provinces were failures. Marriage might be a failure, but those present did not consider pharmacy a failure in Leicestershire. When they bore in mind their two years' experience, the funds they had in hand and the promises of further aid from the Pharmaceutical Society, he considered they had before them a very good and hopeful future, especially for the young men themselves. In starting the Association they of course had two objects in view. The former association was practically an educational association and nothing more, but when they asked the men of business in Leicester and Leicestershire to join them, they promised them to be as it were a kind of Trade Protection Association for furthering and protecting the interests of chemists. He could assure them they were attacked on all sides and in every possible way. They had the encroachment every day of the stores, which had done an enormous injury, not only to the retail chemist, but to every retail trade in the country; nay, he was addressing them in a room belonging to co-operation, which was antagonistic to the retail traders generally, but in time, with energy, perseverance, and intelligent education, they hoped to make a stand against this system of co-operation, whether civil service or army and navy stores, and in the end come out successfully by the superiority of their goods and the intelligent adminstration of their affairs. As was the case with the medical profession, so in their business there were many who attempted to do business illegally as chemists and druggists. It was their duty as an association to try and pick these men out and thus render service to members of the trade. The Association, however, was more especially started for the good of the young men of Leicester and Leicestershire. They had assembled that evening to bid them welcome upon entering on a new session, encourage them to further energy and zealous work, and let them see by example that by these means they might arrive at a haven which would not only be beneficial financially but render their names famous as scientific tradesmen. He had been especially pleased with the addresses delivered during the last month or six weeks. He hoped every young man who studied pharmacy, if he had not already done so, would carefully read Mr. Benger's admirable address at the Pharmaceutical Conference at Bath, the latter part of which was a *résumé* of pharmaceutical education. He stated that we in England were worse off in the matter of early education than any other country, except perhaps America. Mr. Benger told them that in various continental countries the governments took charge of education, and required that every young man entering his apprenticeship should pass a certain examination to assure them of his classical attainments. Their Society in London was endeavouring to pass a similar Bill to make it compulsory that every young man before being apprenticed should receive a classical education, and pass such an examination as would leave him free to work up his technical studies during his pupilage. With the Wyggeston schools in Leicester, and kindred schools in other large towns, he hoped in a few years there would be no young men who had not received a very liberal classical education. He hoped and believed that this Act, when passed, would be of immense value to chemists. As his hearers knew, it was very hard indeed for a young man to be apprenticed to a business, and find on completing it in three or four years that he had to commence *de novo*, and go back, as it were, to school to acquire Latin, arithmetic, etc. This threw a young man back two or three years in his studies, but under the altered arrangements he would be told that unless he passed these preliminary examinations it was no use his passing into the shop to learn the practical part of his business. Referring next to the condition of things in France, Belgium and Switzerland, the President said few had any idea of the superiority of the facilities afforded there for the study of chemistry and its allied sciences. Having read a lengthy quotation in proof of his assertion as to university teachers on the continent, he said this was what they desired in England. They could not all go to the universities, therefore they desired the universities to come to them, and their enormous resources to be used in this way rather than in the education of a select few at the universities themselves. Two years since he went on private business to Zurich, where there was one of the finest technical schools in the world, recently built by the Government at a cost of £100,000, for the establishment of a school for the education of students, architects, doctors and chemists. In view of the great responsibilities devolving upon pharmaceutical chemists, he thought they deserved a great deal more recognition than they received. The speaker pointed out that at the Education Conference of the British Association, Miss Becker laid great stress on the necessity of the proper education of chemists, and he referred also to the address of Professor Roscoe at the opening of the school in Bloomsbury Square. He advised his hearers to read that address, for it was pregnant with the most elementary truths, and well worth perusal by every student of pharmacy. Having quoted from Professor Roscoe's address in favour of the higher education of chemists, the speaker earnestly advised his hearers to make the best use of their time during apprenticeship. As President of the Association he had had the invaluable assistance of several gentlemen who had rendered immense service to the young men as teachers and lecturers, and who at considerable personal trouble had conducted classes in pharmacy, botany and materia medica, and thus many young men had been enabled to pass very creditably the Minor examinations of the Pharmaceutical Society. He would therefore ask the young men to assist them in the efforts which were being made for their own good. These efforts were made entirely in their interests, and

all the promoters asked in return was diligence and attention to their studies, for he and those associated with him would be well repaid if, in the end, the students attained the goal towards which they had been working. He was one of those who regarded it as the duty of every principal to do everything possible for those associated with them in their business. He believed that if a principal took an interest in his young men he would be more than repaid by the extra diligence of the pupil. For these reasons he sincerely trusted the enthusiasm of the principals in the town would be aroused, and that all engaged in the practice of pharmacy would enroll themselves as members of the Association, and the factor in their success at Leicester was the chemical laboratory of the Wyggeston Boys' School. The trustees of that Institution had shown them very great kindness, and the head master, Rev. J. Went, had generously placed the resources of the school at their disposal at a nominal charge. As the result of all this, he would point out to students that with the facilities afforded them, if they worked hard they would be in a position to pass their Minor examinations on the completion of their apprenticeships. In the next place he called attention to the facilities afforded students by the establishment of a botanical garden in connection with the Abbey Park, and acknowledged the assistance afforded the Association by Mr. J. Burn, the head gardener. He hoped the students would reward Mr. Burn for his pains by attending as often as possible for the purpose of studying botany in a garden which he believed was unequalled in England. In conclusion, he would impress upon them the necessity of real hard work, for nothing could be accomplished in this world without it. Let them not imagine that pharmacy, or any other trade or profession, was "a bed of roses," for his experience was that hard and diligent work was absolutely essential to success. If they realized this and acted upon it they might depend upon it they would succeed, and in after years be proud that they had done their best "according to their lights." Let them remember that as in the case of the "Village Blacksmith,"

> "Something attempted, something done,
> Has earned a night's repose."

In the further pursuit of their studies they had his heartiest goodwill. He was prepared to do everything in his power to assist them, and all he asked in return was that they should creditably pass their examinations, for that would amply repay him for any efforts of his on their behalf.

The distribution of prizes then followed.

List of Prizes.

Chemistry.

1st Prize	Mr. J. H. Shepherd.
2nd Prize	Mr. F. O. Beale.

Botany.

1st Prize	Mr. B. Lewitt.
2nd Prize	Mr. G. A. Weall.

Pharmacy.

1st Prize	Mr. J. H. Shepherd.
2nd Prize	Mr. A. Devereux.

Materia Medica.

1st Prize	Mr. F. O. Beale.
2nd Prize . : . . .	Mr. J. H. Shepherd.

The President proposed a hearty vote of thanks to those who had conducted the various classes during the past session. First and foremost, Mr. Burford, F.C.S., had conducted the practical chemistry classes, and he was sure they could not have done without him. Mr. Rowe also rendered indefatigable service, Mr. H. Evans conducted the materia medica class with very satisfactory results, and Mr. Sheppard, who had won several prizes, had given a considerable portion of his leisure time to the work of the classes. He therefore asked the meeting to accord these gentlemen a hearty vote of thanks, not only for their painstaking efforts, but for the practical success which had resulted therefrom.

The motion was carried by acclamation.

Mr. Burford, in returning thanks, expressed his entire satisfaction at the results of the examination. Some of the papers really were brilliant, and all without exception were a credit to the Association.

Dr. Neale proposed a vote of thanks to the President for his practical address and his services in the chair.

Mr. Young (one of the Vice-Presidents) seconded, and expressed his entire concurrence in the President's remarks.

The motion was carried unanimously.

The President having briefly responded, the remainder of the evening was devoted to dancing and other amusements. The arrangements were ably carried out by Messrs. W. Rowe, G. Woolley, M.C., and W. Thirlby.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Half and Half Chemical Formulæ.

Sir,—A criticism of mine started the small controversy which I hope this note will end. Of course there is nothing unscientific or nonsensical in writing $\frac{1}{2}H_2O$ if the letters H and O mean, and if they are stated to mean, the words hydrogen and oxygen, and 1 part by weight of hydrogen and 16 parts by weight of oxygen, and nothing more. The $\frac{1}{2}H_2O$ merely means 9 parts by weight of water. But when a writer also intends, as all but one in ten thousand do, that the letter O also stands for one atom of oxygen, and H_2O for one molecule of water, then $\frac{1}{2}H_2O$ becomes nonsense and non-science. $\frac{1}{2}$ aq. is still less definite. I trust that almost all your readers will avoid the use of either formula, for they would involve a fast and loose way of dealing with those atomic and molecular theories on which the science of chemistry is at present based. $\frac{1}{2}H_2O$ and $\frac{1}{2}$ aq. are only half and half chemical formulæ, and their employment seems to me to admit of only half and half defence.

John Attfield.

The Liquors of the Pharmacopœia.

Sir,—While acknowledging to the full the care and painstaking shown in Mr. Macpherson's elaborate paper, read at the Edinburgh Evening Meeting, on "Liquor Strychninæ Hydrochloratis and other official 1 per cent. Liquors," I should like to draw attention to the fact that the more accurately modelled formula which he proposes was anticipated in a paper which I read before the Dover Chemists' Association, and printed on page 711, vol. 16, [3], of the *Pharmaceutical Journal*.

Market Square, Dover. J. F. Brown.

Cataract.—The plant is a native of the south of Europe. We cannot say where a supply of the juice can be obtained.

J. H. Thursfield.—Morphine dissolves in lime water and, on addition of ammonium chloride to the solution, is precipitated in consequence of the formation of calcic chloride and ammonia, neither of which dissolves morphine.

Grateful.—We are glad to learn that the information published in this Journal concerning phenacetine has been so useful to you.

Communications, Letters, etc., have been received from Messrs. Haddon, Barrass, Powell, Stark, Vizer, Hill, Tanner, Hodgkin.

"THESE EXCELLENT PREPARATIONS."

Edinburgh Medical Journal, August, 1888.

"VALUABLE AND MOST SERVICEABLE. THEIR PURITY AND STRENGTH ARE UNQUESTIONABLE."

The Lancet, September 22, 1888.

"STRENGTH MOST ACCURATELY DETERMINED AND BROUGHT TO THE PHARMACOPŒIAL STANDARD."

Dublin Medical Journal, June, 1888.

"EQUAL TO THE FRESH PREPARATIONS, AND SUPERIOR TO THE ORDINARY ONE-TO-SEVEN INFUSIONS."

The British and Colonial Druggist, May 26, 1888.

Fletchers' Concentrated Liquors

"THESE NEW LIQUORS HAVE HIGHER CLAIMS THAN FOR THEIR MERE CONVENIENCE; THEIR POTENCY IS UNQUESTIONABLE, AND THEY PROVIDE THE ELEMENT OF CONSTANCY WHERE THAT CAN GENERALLY NOT BE ASCERTAINED, OR EVEN OBTAINED, BY THE ORDINARY METHODS."

The Chemist and Druggist, December 3, 1887.

"A DISTINCT NOVELTY . . MANIFESTLY VERY CONVENIENT. We have compared Tinctures, &c., made from these Concentrated Liquors, with similar preparations made exactly according to the B.P. methods, and we find that they are practically identical in character."—*British Medical Journal*, July 7th, 1888.

"SUBJECTED TO A PROLONGED TEST in the dispensing-room of a hospital. The resulting Tinctures are INDISTINGUISHABLE IN STRENGTH, APPEARANCE AND EFFICACY FROM THE OFFICIAL PREPARATIONS. Their strength is constant and easily ascertainable, and they keep well. WE CAN CONSCIENTIOUSLY RECOMMEND THEM."—*The Practitioner*, November, 1888.

Fletcher, Fletcher & Stevenson,

North London Chemical Works, Holloway, London, N.

GOLD MEDALS DUBLIN, 1882; BOSTON, 1883; LONDON (INT. EXHIB.), 1884.
Silver Medal, Liverpool Int. Exhib., 1886. First-Class Award, Adelaide Exhib., 1887.

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The Original Preparation of the Inventor.

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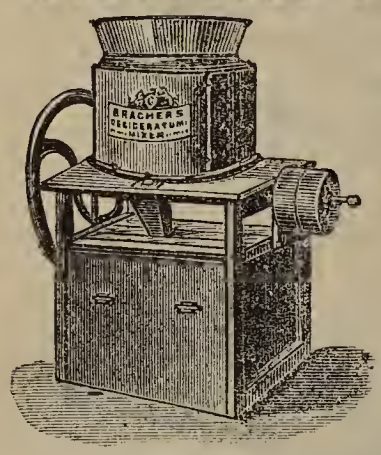

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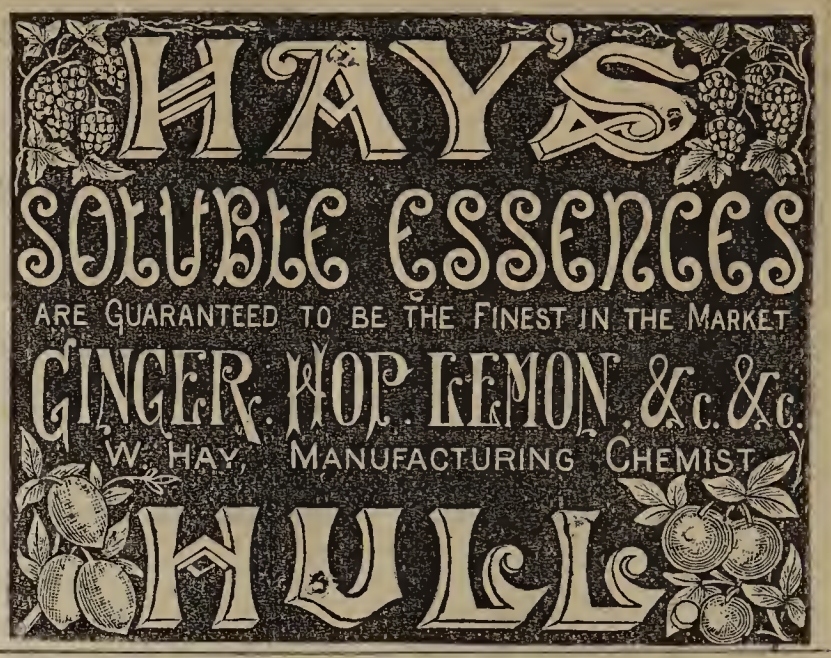

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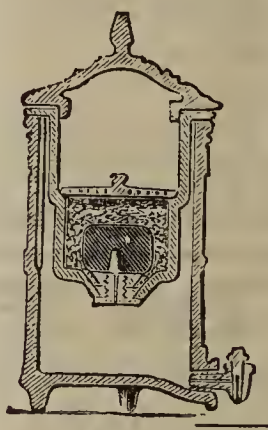

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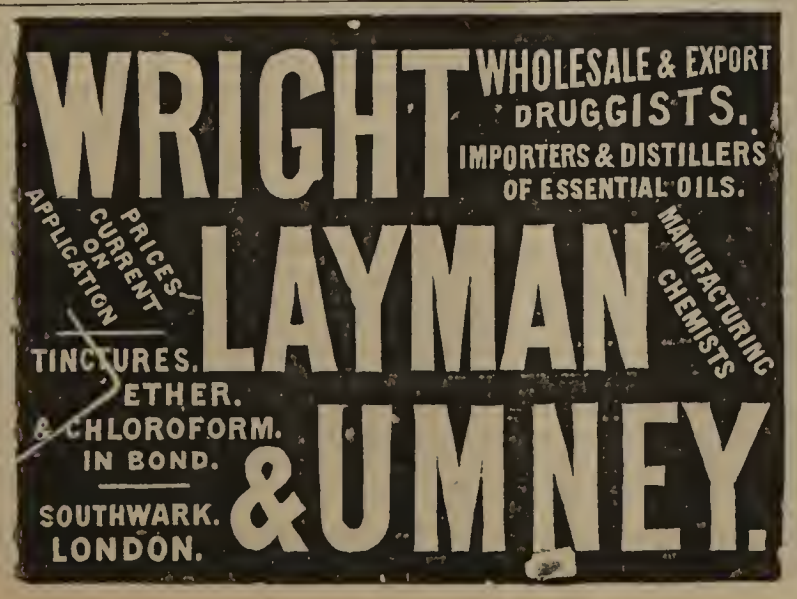

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Appendix to advertisement on page xviii. *in last week's Journal.*

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AS JUNIOR. Age 19. 3 years' experience. P. L. MORGAN, Penpergwm, near Abergavenny.

APPRENTICESHIP for youth. Good Dispensing, Prescribing, Retail business. Passed Preliminary. Abstainer. Particulars. ALPHA, 20, Marville Rd., Fulham.

AS Dentist's ASSISTANT. Has had 4 years' experience. F. W. WARREN, Harborne, Birmingham.

JUNIOR. 3 years' experience. Good Dispenser, excellent Counterman. Tall, gentlemanly, active and obliging. BREEDEN, Mr. Hill, Chemist, Cheltenham.

ASSISTANT. 9 years' first class experience. Age 25. 5ft. 9in. Excellent references. Disengaged. WOODHOUSE, New Rd., Bromsgrove.

ENGAGEMENTS WANTED.

ASSISTANT or DISPENSER. Qualified. Permanent. Locum Tenens. Disengaged. L., 17, Bloomsbury Sq.

ASSISTANT or MANAGER. 25. 10 years' experience CORTEX, 26, King St., Plymouth.

JUNIOR. Good Dispenser. Aged 22. Excellent references. CHEMIST, 148, King St., Hammersmith.

AFTER Christmas.—JUNIOR. In London. Out-door. Minor. X., 103, Marylebone Rd., N.W.

DISPENSER to Surgeon, &c. Age 24. Disengaged. ALPHASHBY, 55, Lorne Rd., Northampton.

LOCUM TENENS, during absence, illness, &c. Qualified. LEX, 121, Cornwall Rd., Bayswater, W.

BRANCH MANAGER or OUT-DOORS. 36. Married. West End experience. Speaks French and German. K., 213, Camberwell New Rd.

MANAGER, by an experienced man. Age 36. Single. Qualified. Accustomed to town and provincial trade. Good Prescriber, Extractor. Suburbs or country preferred. W., 29, Percy St., Tottenham Court Rd., London.

AS ASSISTANT or Branch MANAGER. Age 28. Tall. Experienced. Good References. RHEI, 17, Francis St., W.C.

ASSISTANT. Age 25. Prescribe, Extract. Excellent reference. LEWIS, Post Office, West Bromwich.

AS JUNIOR. Age 22. Height 5ft. 3in. At once. BROOKE Chemist, Doncaster.

LOCUM Tenens. Registered. 5s. a day. MANAGER, 256, Rotherhithe New Rd., S.E.

PARTNERSHIP (Wholesale) wanted by energetic Junior; or situation with view to partnership. London preferred. Qualified. Age 24. 3 years' experience. J. G., 1, Mostyn Rd., Brixton, S.W.

AS Junior ASSISTANT in London. Age 26. Height 5ft. 8in. London and country experience. Good reference. J. ARCHIBALD, 12, High Street, Harlesden, N.W.

JUNIOR. Well up. Country preferred. RHEI, 88, St. George's Rd., Southwark, London.

JUNIOR or DISPENSER to Surgeon, 4 years' experience. D., 26, Trinity St., S.E.

MANAGER. As a permanency. Thoroughly experienced. Qualified. Single. Age 38. R. S., 2, Margaret St., Cavendish Sq., W.

AS MANAGER. Temporary or permanent. Experienced and qualified. Town or country. Mr. TAYLOR, 30, Devonport Rd., Shepherds Bush, W.

BRANCH MANAGER or SENIOR (out-door). London preferred. Age 30. Height 5 ft. 9 in. Minor certificate. Active, steady. Efficient Tooth Extractor. References. HOLIK, Barron, Squire & Co., Bush Lane, Cannon St., E.C.

TEMPORARY. Out-door. Branch. Minor. Married. Experienced. 30. F., 27, Conewood St., Highbury.

JUNIOR. London. Time for study or lectures. Tall. Age 20. MCFALL, Bankfield Rd., West Derby, Liverpool.

ASSISTANT. 22. Qualified. 5½ years' West-End and Provincial experience. Good references. WRIGHT, 30, Conduit St., W.

MR. HOWSE, 159, Copenhagen St., N., takes confidential management during absence, or illness. Town and country experience.

AS MANAGER. Long experience in good business. Retail, Dispensing, local Wholesale, oils, colours, &c., and the wine and spirit trade. Good buyer and energetic salesman. MANAGER, 69, Ormerod Rd., Burnley.

ENGAGEMENTS WANTED.

OUT-DOOR. 23½. Experienc d knowledge Homœopathy, photographic goods. Reference. Reasonable salary. Married. FAULKNER, Hatton Garden, Newark.

JUNIOR. Tall. Gentlemanly. Age 20. 6 years' experience. Good dispenser. Extract Teeth. Preliminary. W. THOMSON, 7, Hillside Villas, Bradford.

ASSISTANT, MANAGER, or DISPENSER. Permanency. Good Counterman, Dispenser, &c. References. Age 27. SOLVAS, 1, Victoria St., Paddington, W.

MANAGER of Branch, LOCUM TENENS, or otherwise. Minor. Good References. Out door. London. STATIM, 2, Trinity Sq., S.E.

LOCUM TENENS.—Experienced. Good Prescriber. Abstainer. Mr. COOKE, Pharmaceutical Chemist, Lingwood, Norwich.

ASSISTANT or DISPENSER. Temporary, permanent. Age 24. Experienced. CHEMIST, 368, Caledonian Rd.

BY a young German Apothecary, who is well acquainted with the German and French languages, an engagement in London or in a good provincial city, where he can learn the English language and English pharmacy. Only board and lodging expected. F. S., I. Fleischmarkt 1, Vienna, Austria.

ASSISTANTS WANTED.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

NAPLES. — Experienced ASSISTANT immediately wanted, speaking French, English, and possibly German, and knowing the International Pharmacy. Apply to PROF. L. D'EMILIO, 303, Via Roma, Naples.

CLERK wanted. Must write a good hand. Apply by letter, H., Grosvenor Library, Chapel St., S.W.

ON or about January 1st, 1889, a competent ASSISTANT, accustomed to first-class Dispensing. Must be a good Counterman. Hours of business by arrangement. Applications not answered by the 12th inst. declined. Apply, stating age, &c., to JULIAN HORRELL, Pharmaceutical Chemist, Broadstairs, Kent.

MENTONE.—ASSISTANT wanted immediately, speaking French fluently. Must possess good references, and be qualified. For particulars apply to MON. P. BEZOS, 27, Rue St. Michel, Mentone.

AFTER Christmas. A JUNIOR about 22, of good experience and address, with time for study according to arrangement. Apply, personally preferred, to W. HICKMAN, Archer St., Notting Hill, W.

AT once.—JUNIOR. Minor qualification. Out-door. Apply, personally, to R. C. L., 93, Finsbury Pavement, City.

ASSISTANT, in-door, about 22 years of age, for a light Retail and Dispensing Business. One accustomed to Prescribing and Extracting Teeth preferred. State age, height, salary required. Send references and carte, which will be returned. W. WOOTTON, 33, Liverpool Rd., Islington, N.

BRANCH MANAGER wanted. Qualified. Used to active Mixed business. No attendance on Sundays. Must have unexceptionable references. Address, K., care of Clarke, Son & Platt, 85, Gracechurch St., E.C.

ENERGETIC JUNIOR, in-door, who has had good experience, and can be well recommended. Apply, stating full particulars, to Messrs. FOSTER & DALLAS, Pharmaceutical Chemists, 1, Lavender Hill, London, S.W

ASSISTANTS WANTED.

IMMEDIATELY, a qualified and efficient Assistant. Applicants will kindly enclose carte, which will be returned, and name references, age, height, and salary, with any other particulars which will facilitate negotiation, and save writing. All letters complying with these conditions answered by return of post, or by wire. Drane, Cardiff.

HAMILTON, LONG & CO., State Apothecaries and Chemists to the Queen, 3, Lower Sackville St., Dublin, have a vacancy for a Junior Assistant. Apply, enclosing carte, stating age, height, references, and salary required.

ASSISTANT for a light easy branch. A good Prescriber and Counterman seeking a permanency. State salary, progressive, references, and when disengaged, to Statim, Hodgkinson & Co., 198, Upper White Cross St., E.C.

IMMEDIATELY.—An Assistant. Capable of taking charge of a branch. Must be neat and accurate in his work and gentlemanly in his manners and address. Sober, good counterman, prescriber, able to extract teeth. Indoors. State age, height, salary, references, enclosing carte (to be returned). Griffith, The Medical Hall, Canterbury.

AN Assistant wanted in light Retail and Dispensing business early after Christmas. Age 20 or 21. Applicants requested to state age, height, experience, and salary, also enclose photograph (to be returned), to Mr. H. Badcock, 101, High St., Lymington.

BY January.—A Junior Assistant. Indoor. Competent to dispense, and accustomed to general retail. Must have a gentlemanly address and write a good hand. Applicants will please give references, age, height, and salary required. Apply to George Shepperley, Pharmaceutical Chemist, Market Pl., Nottingham.

A QUALIFIED Assistant. In-doors. Abstainer. First-class experience and references. Salary £50. Personal interview, if possible. Tupholme & Son, 1, Coleherne Terrace, Earl's Court, S.W., Station, Earl's Court, District Railway.

CHEMIST contemplating retirement ere long. Might make an opening for a competent and active young gentleman with some capital. Age between 19 and 23. He would receive, as remuneration, £40 per annum for each £100 invested. Business chiefly Dispensing. Address H., 216, "Guardian" Office, Cross St., Manchester.

A COMPETENT Assistant. Minor qualification. In-doors, and whose references are unexceptionable. Also a Junior. Apply, stating height, salary, and general particulars to H. Hyett, Bailgate, Lincoln.

A JUNIOR Assistant. Age about 23. Minor preferred. Must be thoroughly proficient in Dispensing, and used to general first-class Retail. Apply by letter, with full particulars, to Hopwood & Son, Richmond, Surrey.

ASSISTANT. Minor qualification. Age about 25. For a good country, Dispensing and Retail business. Junior also kept. Apply, with full particulars of former experience, age, height, and salary, also enclose photo, to John Rae, Chemist, Newmarket.

BEGINNING of January.—A thoroughly competent and experienced Manager. Out-door. About 30 years of age. Accustomed to first class trade, with London experience. Apply personally to Morgan Bros., 25, Brecknock Rd., N.

ENERGETIC, reliable man wanted to take the lead in large pushing Retail. No night or Sunday duty. First-class references. Address, X., care of Clarke, Son & Platt, 85, Gracechurch St., E.C.

ASSISTANTS WANTED.

MESSRS. GIBBS & GURNELL, Ryde, will require a good Dispensing Assistant, used to a first-class business. They are also prepared to take an Apprentice. Both after Christmas. Letters not answered in two days must be considered as declined.

IMMEDIATELY.—Qualified in-door Assistant, to take Dispensing and assist in general Retail when required. Not under 25 years of age. Apply, T. Tomlinson, 2, Lower Seymour St., Portman Sq., W.

DISPENSER immediately, out-door, for large City Retail. Must be quick, neat and accurate, possessing Minor qualification and undeniable references. Apply, by letter only, giving all particulars, to Chemist, 4, Franklin Rd., Penge, S.E.

GOOD Junior required immediately, for front counter. Age about 24. Shirtliff & Co., 66, Goldhawk Rd., London, W.

JUNIOR Assistant, first week in January, for a Dispensing business. One desiring permanency preferred. Apply personally, if convenient, or by letter, stating age, height, salary, and send photo, to Henry Peet, The Mount Pleasant Pharmacy, Liverpool.

PUPILS (out-door).—Vacancies for two young gentlemen in the Dispensary of a London Hospital. Laboratory, Steam plant, &c. Premium required. Apply to Pharm. Chemist, 70, Church Rd., Islington, N.

BUSINESSES FOR DISPOSAL.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

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BIRMINGHAM (high class suburb).—Superior Dispensing, Prescribing, light Retail, returning £400. Owner, having purchased much larger business, will sell for £200 cash, or stock may be reduced £50 or more to suit purchaser. Very good house and premises. Rent £35. Shop is beautifully fitted and trade capable of great increase. Only cash purchasers need apply. Address on the premises, Smith, 6, High St., Harborne, Birmingham.

£275.—A small, genuine, unopposed country Business. Convenient shop, house and garden. Rent £25. Thompson, Pharm. Chemist, Buckfastleigh, Devon.

LONDON, W.—For immediate disposal, a compact little Retail, Dispensing and Prescribing Business, well stocked and nicely fitted. Large house and low rent. As owner is going abroad and must sell before Christmas no reasonable offer will be refused. Chemist, 113, The Grove, Hammersmith.

CHEMIST'S Retail. Small genuine concern suitable for branch. Dentistry might well be added. Has averaged £314. £150 or reasonable offer. Apply, G. W., 70, Ledbury Rd., W.

VERY old established Retail and Manufacturing Business for sale. Good city position. Letter to Executor, care of R. Simpson, Campdale Rd., Tufnell Park, N.

EASTERN County.—For immediate sale, a genuine unopposed mixed Business, with Gilbey's agency. Profits about £150 a year. Pleasantly situated in large village. Good shop, plate glass front. Convenient house. Private entrance. Large garden and warehouse. Rent on lease £24. For particulars, P. O., Willows, Francis and Butler, 101, High Holborn.

BUSINESSES FOR DISPOSAL.

SEVERAL Businesses for disposal, ranging from £200 to £500, in Manchester, Blackburn, Bury, Hyde, Hanley, Howden, Staleybridge, and Sheffield. Apply Thos. Tomlinson & Son, 9, New Cannon St., Manchester.

CHEMIST'S Business for sale, London S.E. district (established 1825), owing to death of proprietor. First-class position. New station coming opposite. Moderate rent. Lease 16 years. Doing a good Family and Dispensing business. Price £1200. J. E. M., care of Wright, Layman & Umney, 50, Southwark St., London, S. E.

THE Proprietor of two branch Businesses in London, N. district, is desirous of Disposing of same together or separate. Suitable for a young man starting. Capable of great improvement. Price £80 and £450. Rent £36 and £100. Let off £90. Address, Chemicus, care of Mr. Crane, 121, Church St., Stoke Newington, London, N.

FOR immediate disposal. A small Retail and Prescribing Business, situated in a busy thoroughfare and thickly populated neighbourhood. A good opportunity for beginner with small capital. For particulars, address R. W. Borman, Chemist and Druggist, 67, Freeman St., Grimsby.

£225 CASH. Balance by instalments. First-class Retail and Dispensing Business, in first-class and rapidly increasing locality, within 15 miles South of London. Under manager, and returns increasing. Principal would do £1000 a year in short time. Modern house. Garden. Shop handsomely fitted and well stocked. Vendor, 46, St. James' Grove, Peckham Rye, London.

LIVERPOOL.—Good Dispensing Business, with or without valuable proprietaries, to be disposed of at once owing to illness of the proprietor. Takings over £600. First-class neighbourhood. Favourable terms. Full particulars and investigation to genuine applicants. Address, Proprietor, care of Messrs. Evans, Sons & Co., Hanover St., Liverpool.

RETAIL and Prescribing Business, situated in the East of London, returning £650. Large shop, well fitted and stocked. Good house, at a moderate rental. Price only £300 to effect a speedy sale, simply the value of the stock and fittings. Opportunity seldom offering. A. P. S., care of Deacon, Leadenhall St., E.C.

BUSINESS WANTED.

Advertisements under this heading are charged as follows—
Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.
N.B.—Postage Stamps cannot be received in payment.

RETAIL and Dispensing Business. Returns about £1000. Cash. Main road. Must bear close investigation, or partnership would be entertained with view to purchase. Full particulars, which will be treated in strict confidence, to D. S., Messrs. Rew & Co., 273, Regent's St., W. No agents.

TO BE LET.

EAST DULWICH.—To Chemists. To be Let, a capital shop and 5-roomed house. Rent £30. Good opening for above. Apply to Messrs. S. Walker & Rüntz, 22, Moorgate St., E.C.

DOUBLE-FRONTED Shop to let, in Clapham, main road. Good position, and very suitable for Chemist. One much required. Good house and small garden. Rent £75. Apply, J. N., 3, Carlton Mansions, Clapham Rd., London.

Mr. G. B. CROCKER,

Valuer, Transfer Agent & Accountant,

15, WALBROOK, E.C.

Surrey.—Good class Retail and Dispensing. Returns £1000. Price £850. Net profit £370. Good house and garden.

Home County. — Good country Trade. Unopposed. Returns £1000. Profits much above the average. Price £1050. A safe investment.

Midlands.—Retail and Prescribing Trade. Returns £600. Price £275. A bargain.

Kent Coast.—High class Retail and Dispensing. Returns £850. Price £750. Good house and garden.

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Established 1870.

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Yorkshire.—Dispensing and light Retail. Net profit £350. Good house. Bath room. Price £700.

Home County.—Good class Retail, Dispensing and Prescribing. Returns £2200. Price £1500. Retiring.

Midlands.—Retail and Prescribing. Returns £700. Good house. Very profitable trade. Price £400.

Staffordshire.—Branch Retail. Returns £300. Principal would double. Price £120.

London, N.W.—Good class Dispensing. Returns £600. Good house and garden. Price £450.

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W.—Retail and Prescribing. Returns £300. Price £100. Splendid chance for beginner.

Particulars of above and others free on application.

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8, Stockbridge Terrace, Victoria Station, S.W.

Chemists' Valuer & Transfer Agent.

In one of the largest towns of Yorkshire.—A profitable Retail, Prescribing and Proprietary Trade. Returning £900. Rent £40. Double-fronted shop, well-fitted. Proprietor going abroad, will accept valuation to secure early sale. With the above, or separately, a smaller Business of the same class, returning about £450. Rent £30. Now carried on as a branch.

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Several good Businesses in all parts of the country.

Buyers are invited to state their requirements. Vendors having Businesses in London or South of England can be introduced to purchasers.

The Pharmaceutical Journal

For Terms for Advertisements see page iii.

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Businesses thoroughly investigated for Buyers.

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Vendors of good class Concerns can be at once supplied with Partners or Buyers, as F. J. Brett has buyers prepared to invest from £1500 to £3000.

Transfers, Valuations and Auctions conducted throughout the United Kingdom by Mr. BRETT, Leicester.

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BY Order of the Executors of the late Mr. J. W. CARRINGTON, 59, Hall Place, Paddington, W. Excellent Chemist's SHOP and PREMISES, held for a term of 80 years from 24th June, 1858, at £7 7s. per annum, and of the rental value of £45 per annum, with possession. Mr. GAIGER is instructed to sell by auction, upon the above premises, on Monday, 10th December, 1888, at 12 o'clock precisely, this Capital Long Leasehold Property. Particulars and Conditions of Sale may be obtained of Messrs. DENTON, HALL & BURGIN, 15, Gray's Inn Sq., W.C., or of the AUCTIONEER, 68, South Audley St., Mayfair, W.

TO Chemists and Druggists.—By Order of the Executors of the late Mr. J. W. CARRINGTON, 59, Hall Place, Paddington, W. Mr. GAIGER will sell by auction, upon the premises, on Monday, December 10th, 1888, at 12 o'clock precisely (immediately after the sale of the lease), the superior Stock-in-Trade of a Chemist and Druggist, including a large number of Stoppered Bottles, Carboys, Specie Jars, Show Bottles, and the Mahogany Shop Fittings, Fixtures, &c. Catalogues may be obtained of Messrs. DENTON, HALL & BURGIN, 15, Gray's Inn Sq., W.C., or of the AUCTIONEERS, 68, South Audley St., Mayfair, W.

WEST BROMWICH DISTRICT HOSPITAL.

TENDERS FOR SUPPLY OF DRUGS.

Persons desirous of contracting for the supply of the above from January 1st, 1889, to June 30th, 1889, are requested to apply to me, the undersigned, for a form of "Tender" (no other will be received). It is requested that the Tenders be delivered, "sealed," at my office, not later than 10 o'clock on Monday, 17th inst., and endorsed "Tender for Drugs." The Board of Management do not bind themselves to accept the lowest or any Tender, and reserve to themselves the right of deciding in case of dispute with regard to the quality of any article supplied.

By order of the Board,
W. H. LABAN, Secretary.

Board Room, December 4th, 1888.

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MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

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2. LONDON, S.W.—Very old-established good class BUSINESS. Returns at present £600 yearly; capable of being much increased. Shop handsomely fitted and good stock. Price about £600.
3. LONDON, N.W.—Family Retail and Dispensing BUSINESS. Returns over £550 yearly. Handsome shop and good stock. Good house, &c. Price £450, or valuation terms can be arranged.
4. KENT.—Within easy distance of London. Very profitable Retail and Dispensing BUSINESS. Corner shop, main thoroughfare. Returns nearly £800 yearly. Profits above the average. Good house; low rental. Price, to include valuable Proprietaries, £800.
5. HUNTS.—Unopposed Country BUSINESS (Mixed). Returns last year £640, with good profits. Single-fronted, well fitted shop, and good stock. Vendor taking a larger business, will accept £300. Good house and garden.
6. MIDLANDS.—Very old-established Mixed BUSINESS. Held by vendor many years. Returns nearly £3000 yearly, with good profits. Good house, &c. Terms, small premium and valuation. Reference required.
7. WORCESTERSHIRE.—Dispensing and Retail, situate in the centre of a very favourite locality. Handsome, double-fronted shop and good stock. Returns £2500. New lease to be granted. Price about £1550.

Personal applicants receive Messrs. O. & Co.'s direct attention and advice, where required, free.

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The Pharmaceutical Journal AND Transactions.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

CHRISTMAS VACATION.

The Library and Museum in London will be closed from 2 p.m. on Saturday, December 22nd, until 9 a.m. on Thursday, December 27th, and will not be open in the Evening from Thursday, December 27th, to Tuesday, January 1st, both dates inclusive.

The Society's House in Edinburgh will be closed on Christmas Day, and also on New Year's Day. It will not be opened in the Evening from Wednesday, December 26th, to Monday, December 31st, both dates inclusive.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

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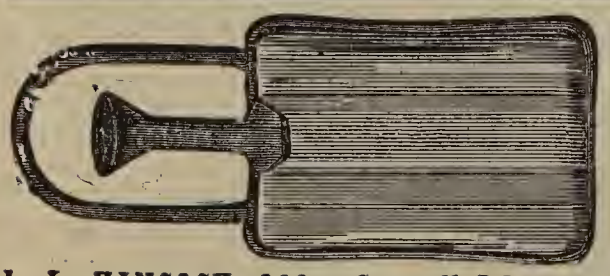

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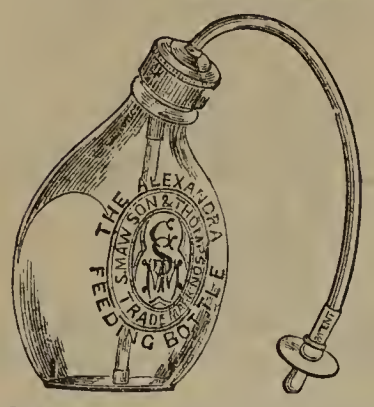

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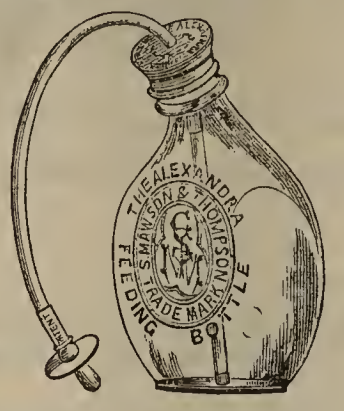

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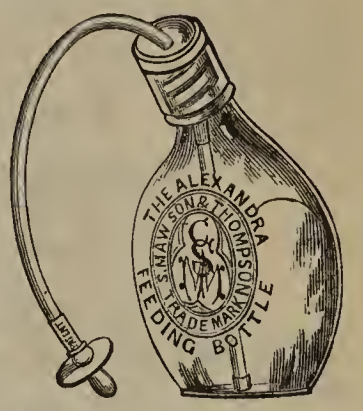

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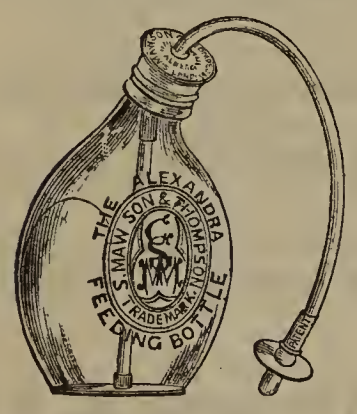
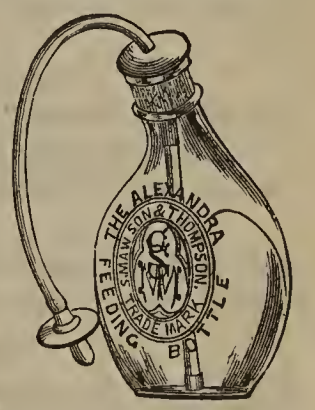


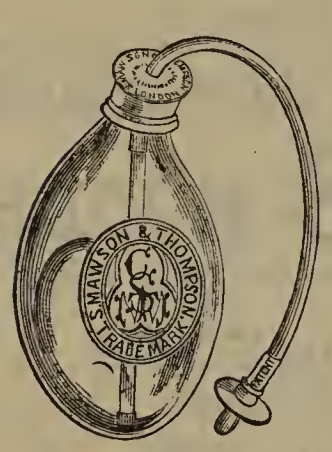
Alexandra Feeding Bottle,
Earthenware Cap.
8*s.* per doz.

Fountain Feeding Bottle,
Screw Glass Stoppers.
20*s.* per doz.

Fountain Feeding Bottle,
Screw Glass Stoppers.
12*s.* 6*d.* per doz.



Alexandra Feeding Bottle,
Wood-top Cork.
3*s.* and 3*s.* 8*d.* per doz.



Oval Feeding Bottle,
Earthenware Cap.
8*s.* per doz.

Export Feeding Bottle,
Earthenware Cap.
7*s.* 3*d.* per doz.

Export Feeding Bottle,
Screw Glass Stopper.
7*s.* 6*d.* per doz.

Export Feeding Bottle,
Screw Metal or Earthenware Cap.
9*s.* per doz.

Export Feeding Bottle,
Metal Cap.
4*s.* 6*d.* per doz.

Export Feeding Bottle,
Wood-top Cork.
2*s.* 9*d.* and 3*s.* 6*d.* per doz.

Export Feeding Bottle,
Screw Glass Stopper.
4*s.* per doz.

Export Feeding Bottle,
Screw Metal Cap.
4*s.* 6*d.* per doz.

FOR FURTHER PARTICULARS SEE QUARTERLY PRICE CURRENT, PAGES 46 AND 47.

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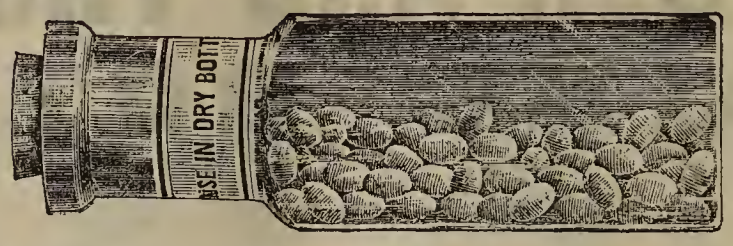
EXACT  SIZE.

Bottles containing 25 Pills, 7s. per doz.; Bottles containing 100 Pills, 24s. per doz.

Formula, Aloin, Strychnine, and Belladonna.—McK. & R. Pills.

Aloin	1–5 gr.
Strychnina	1–60 gr.
Ext. Belladonnæ	1–8 gr.

DOSE.—One pill three times a day. Morning, noon, and night. Where a painless peristaltic action is desired by the aged or female patient, one pill may be taken every night or second night at bedtime, as directed by medical attendant.

Since introducing this formula to the profession and adding the granule to our list our sales have been exceedingly large. Over one million were dispensed last year. We have received numerous letters and reports from physicians, speaking in the highest terms of the results of their administration, and thanking us for introducing this granule to their notice.

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"*These Tonic Laxation Pills can be taken with advantage in those cases* (*mainly female*) *where tonics alone set up strangury from their action upon the vesical centres in the spinal cord.*"

Aloin, Strychnine, and Belladonna Pills are prepared by McKESSON & ROBBINS, NEW YORK, expressly for the use of Physicians and Surgeons, and to be dispensed in Prescriptions.

In this form the ingredients are not only perfectly preserved, but do not affect the teeth, or offend the palate, and, further, can be conveniently kept out of sight by those who object to be regarded as invalids. Complete list mailed free on application. PLEASE SPECIFY McK. & R. PILLS.

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LONDON.] DECEMBER 15TH. [1888.

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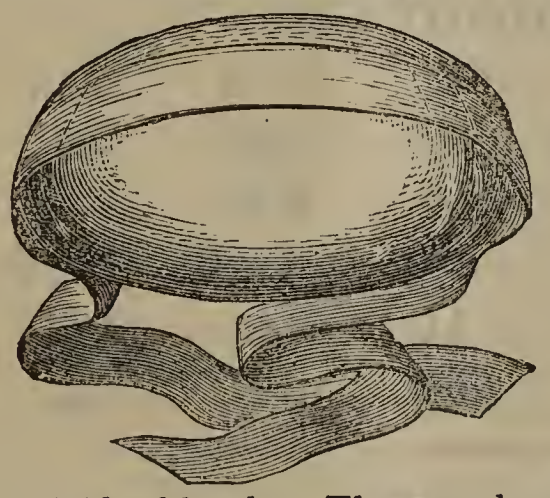
Lawton's Absorbent Cotton is of beautifully downy flocculence, free from chemicals and irritating particles, and of snowy whiteness. It will absorb thirteen times its weight of water, and is admirably

adapted for surgical and gynæcological purposes. "It is beautifully soft, really absorbent, and quite free from chemicals."—*The Lancet.*

Supplied to the trade in 2 oz. packets at 8s. per doz., 4 oz. packets 12s. 6d. per doz., and 16 oz. packets 36s. per doz. Retail prices, 1s., 1s. 6d. and 4s. each.

B. W. & Co. Antiseptic Wound Pad.

The B. W. & Co. Antiseptic Wound Pad is an adaptation of the artificial antiseptic sponge, with a bandage attached, suitable for immediate applica-



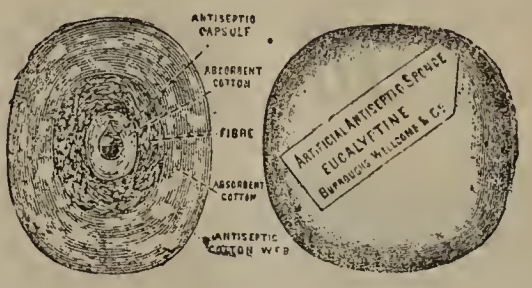
tion on the field of battle. These pads were used with great success at Suakim during the Soudan Campaign.

Supplied to the trade at 3s. per doz.

B. W. & Co. Artificial Sponges.

These are of two kinds—plain and antiseptic—and are for the use of military, naval and civil surgeons in private or hospital practice, and for nurses and invalids as well. Each artificial sponge is about half again as large as a man's fist. It is composed of concentric layers of absorbent cotton and elastic fibre, covered with antiseptic gauze. The antiseptic sponge contains, in its centre, a friable capsule; this, when broken by pressure, sets free an antiseptic, which permeates the whole sponge.

The sponge is soft and elastic, will absorb about 13 times its weight of blood or water, is free from



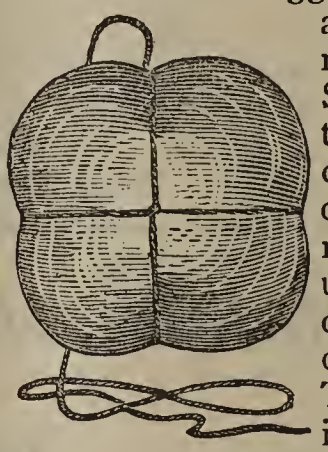
contaminating disease germs, and being inexpensive may be burned after using once.

There are four varieties of artificial sponges, viz.:—1. Plain. 2. Eucalyptia. 3. Carbolic Acid. 4. Thymol.

Supplied to the trade at the following prices: Plain sponges 1s. 6d. per doz.; antiseptic 2s. per doz.

B. W. & Co. Vaginal Tampons.

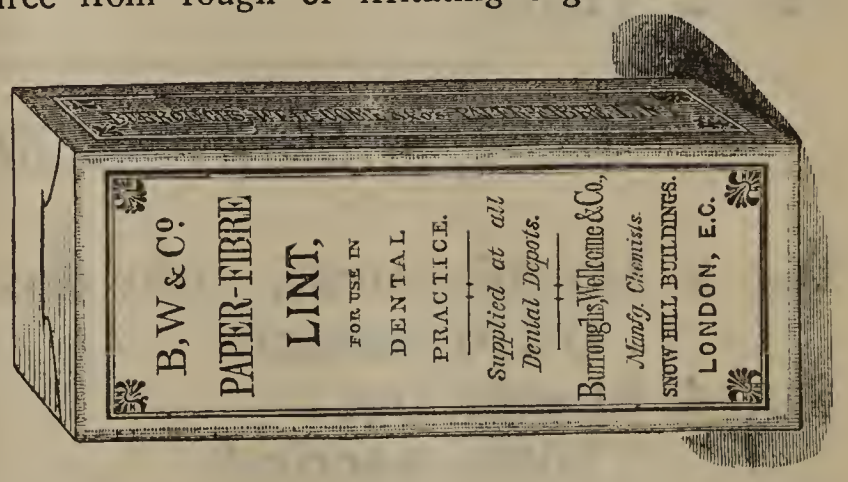
These were suggested by Dr. Fancourt Barnes, and are a small egg-shaped modification of the Antiseptic Sponge, with a silk cord attached to each. They are for the application of medicaments to the cervix uteri, and for the treatment of displacements of the uterus. They are easily introduced and removed, and are cleanly, efficient and economical. They are charged with eucalyptia, iodine, iodized phenol, belladonna and thymol respectively.



Supplied to the trade at 3s. per doz.

B. W. & Co. Paper-Fibre Lint.

This is homogeneous, highly absorbent, pure, and free from rough or irritating ingredients. It is



admirably adapted for surgical and dental purposes, and is supplied in sheets at 4s. per lb.; also in strips for dentists in half pound boxes at 2s. 6d. per box. It may be used in place of Piline Tissue.

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CHEST PROTECTORS & VESTS

FOR SHIELDING THE LUNGS.

FIG. 3.
Double, for the Chest and Back.

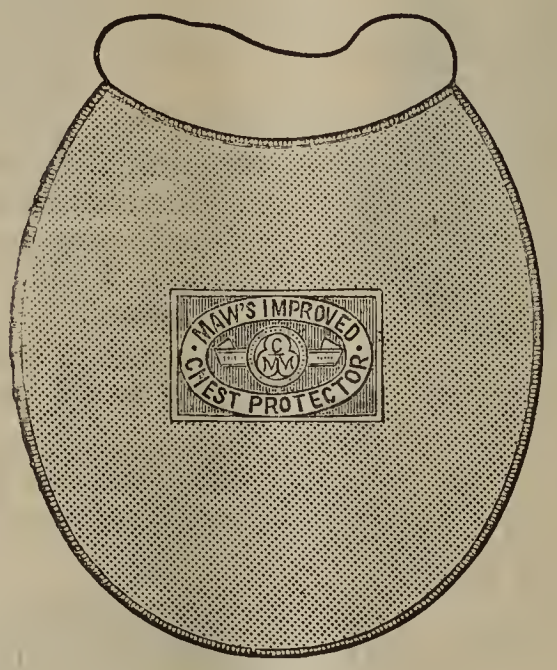

FIG. 4.
Single, Chest Protector.

FIG. 5.
Vest, a Shield for the Lungs.

CHAMOIS AND FLANNEL.

		No. 1.	No. 2.	No. 3.	No. 4
Fig. 3. Double	per doz.	20/	26/	32/	39/
Ditto, perforated	„	24/	32/	38/	46/
Fig. 4. Single	„	9/	11/6	13/6	16/
Ditto, perforated	„	11/	14/	16/	19/
Fig. 5. Vests „	„	27/	34/	42/	51/

FELT, ASSORTED SCARLET AND WHITE.

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
Fig. 3. Double, best, per doz.	17/	22/	27/	33/	44/
Ditto, second „	14/6	19/	23/	28/	37/
Fig. 4. Single, best „	7/6	9/6	11/	14/	20/
Ditto, second „	6/6	8/	9/6	12/	16/
Fig. 5. Vests, Scarlet „	17/	22/	27/	33/	40/

Special quotations to Wholesale Buyers.

S. MAW, SON & THOMPSON, LONDON.

RECENT DONATIONS TO THE MUSEUM.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society of Great Britain.

MASSOI BARK.

Some specimens of the barks known in the East under this name, and which were recently presented to the Museum of the Society by Professor Van Eeden, of Haarlem, may possibly serve to throw some light upon a product concerning which some little confusion still exists in commerce.

The name of Massoi appears to be given to three distinct barks, which are identified by Dr. F. Hekmeyer as the products respectively of *Cinnamomum xanthoneuron*, Bl., *Cinnamomum Kiamis*, Nees., and *Sassafras Goesianum*, T. and B. The second is also called by the Malays "Kayu manis sabrang."*

The first of these, as received from the Haarlem Museum, occurs in pieces about 3 to 4 lines thick, with a thin, uneven, outer dark layer, which is seen under a lens to be composed of stratified cells; the layer beneath this is granular, the white sclerenchymatous bundles being irregularly arranged in a direction parallel to the surface, except near the inner surface, where they form two nearly regular lines. The portion next the inner surface is darker in colour, forming rather more than one-third of the thickness of the whole bark, and shows numerous thin medullary rays. It is this portion of the bark that appears to be most oily and aromatic. The odour, when observed at a distance, resembles that of cocoanut milk. The taste is pungent, the flavour somewhat resembling the odour, but also recalling that of a mixture of cinnamon and rue.

The second bark is in quills like cinnamon, but as thick as cassia, somewhat wrinkled externally, extremely hard and woody, and is almost horny in consistence. It has very little odour, but a pungent taste, and a slight flavour between that of cinnamon and cassia. The inner surface is finely striated, and the transverse fracture is dark internally and paler towards the outer surface.

The third bark is thinner than the first, but resembles it in odour. The taste also is very similar, but more pungent and faintly bitter, causing a sensation of heat in the mouth for some time and an augmented flow of saliva. The bark is, however, only half the thickness, barely attaining two lines. It is paler in colour in transverse section, is marked externally with faint longitudinal cracks, and is more markedly striated internally. In transverse section it presents a short granular fracture, the sclerenchymatous bundles being arranged at right angles to the surface, but the middle layer, corresponding to that of *C. xanthoneuron* in which these bundles are horizontally placed, is scarcely developed. *Cinnamomum xanthoneuron* and *Sassafras Goesianum* are both natives of New Guinea, and *C. Kiamis* of Java, Sumatra, and apparently also of Borneo.

All these barks are met with in the bazaars in Java, and are used in cases of colic and diarrhœa and in spasmodic affections.

According to Teysmann and Binnendyk *Sassafras Goesianum* yields the true massoi bark.

In the Hanbury Collection there is also a bark labelled massoi bark, corresponding exactly in structure, taste, and odour with the bark of *S. Goesianum*. It is labelled on the bark, apparently in the writing of Mr. Thos. Hanbury: "This bark I bought at a Kling shop; they could tell me nothing about it, except that it was used to scent or flavour medicines."

On the outside of the box it is labelled, in Daniel Hanbury's writing, "Cortex Massoi (of) *Blume's* 'Rumphia' (Laurineous ?) bark, smelling like the Brazilian *Casca pretiosa*.* Bought at Singapore by Thos. Hanbury, 1853. Found this bark identical with that procured by Guibourt at the *Musée Japonais*, vide *Hist. des Drogues*, ed. iv., tom. ii., p. 383; compared the two at Paris, April 22, 1854."

On the inside of the cover of the same box is the following note:—"Professor C. L. Blume, in reply to my inquiry respecting this, a specimen of which I sent him, writes thus under date January 5, 1857.

"2. Écorce ayant l'odeur de la *Casca pretiosa* du Brésil (Singapore). C'est Cortex Massoi figuré dans la *Rumphia*, quoique la face interne de votre échantillon soit un peu plus claire, ce qui parait résulter de l'age de l'arbre. Son odeur pénétrant, balsamique, tirant sur l'essence de citron, est très charactéristique.† Je possède de cet arbre de la Nouvelle Guinée seulement les branches avec les feuilles, ce qui me met en état de dire que c'est bien une Laurinée mais n'appartenant pas au genre de Cinnamomum."

It may be here remarked that it is very difficult to describe an odour, and although Hanbury has identified it with Guibourt's bark, 'Écorce de massoy de la Nouvelle Guinée,' Guibourt gives quite a different description of its odour. When the odour, as in the case of Massoi bark, resembles a mixture of odours, it is naturally likened to different products by different observers. Guibourt, in the following description of the bark, likens it to cummin.

"Telle que je me la suis procurée à une exposition qui a en lieu il y a quelques années à Paris, sous le nom de Musée japonais, cette écorce est cintrée, épaisse de 7–8 millimetres, couverte d'un épiderme gris rougeâtre legèrement tuberculeux et formée d'un libre gris rosé dur et compacte à structure un peu radiée sur sa coupe transversale. Elle possède une odeur très-forte, analogue à celle du cumin, et une saveur très-âcre avec le même goût de cumin."

I have, however, not depended upon my own opinion alone, but have obtained from more than one observer a corroboration of the opinion that the odour resembles that of cocoanut milk. Leaving, however, odour out of the question, Guibourt's description of the structure of bark corresponds exactly to the bark of *Sassafras Goesianum* of the Haarlem Museum, and as the Hanbury specimen has been identified by himself with Guibourt's, and by Professor Blume with the bark of the tree described in 'Rumphia,' there can be no

* The name "sabrang" distinguishes it from the bark Kayu manis (*Cinnamomum Parthenoxylon*), which is also used by the Malays in colic and diarrhœa. Kayu manis, as represented in the late Colonial Exhibition in London, differs from all the above-named barks in having a somewhat camphoraceous taste.

* The bark of *Mespilodaphne pretiosa*, Nees.

† The lemon odour is not very perceptible; in the specimen it resembles more nearly rue or the fruits of *Xanthoxylum alatum*.

doubt that to this tree the true Massoi bark must be ascribed.

Whether or no this be the massoy bark from New Guinea from which Messrs. Schimmel (*ante*, p. 327) also have distilled an oil having an odour resembling that of nutmegs and cloves, cannot be ascertained in the absence of specimens for comparison, but if their description of the odour be correct it is more likely to be the *Cortex Culilabani Papuanus* of Martiny's *Encyclopœdia*, 1, p. 436.

The specimen of this bark in the Hanbury collection has a flavour which might be likened to that of cloves and nutmegs. The bark is, however, quite different in appearance and odour from the true massoi bark,* being much thicker, softer, somewhat laminated, and not at all radiate in structure.

CARBON DISULPHIDE IN OIL OF MUSTARD.†

BY FRANK X. MOERK, PH.G.

The first detection of carbon disulphide in the volatile oil of mustard was attributed to adulteration, but the statement of the producer that his oil was made from the seeds of *Sinapis juncea* caused new experiments to be made, as the result of which Hoffmann established the presence of carbon disulphide in the oil of *Sinapis juncea*, as well as in the oil of *Brassica nigra* and the artificially-prepared oil. Paul Birkenwald uses the following mode of examination; 1 c.c. is measured into a tared stoppered flask, the weight of the oil ascertained, 10 c.c absolute alcohol added to dissolve the oil and agitated after addition of twenty drops of an alcoholic potassium hydrate solution until the odour of the oil has entirely disappeared. The contents of the flask are then dissolved in water, acidulated with acetic acid and titrated with $\frac{1}{10}$ n. copper sulphate solution (12·47 gm. per litre). The end of the reaction is ascertained by a red coloration or precipitate if a drop of the solution is placed on blotting paper and a drop of potassium ferrocyanide solution added. Each cc. of the copper solution represents 0·0086 gm. carbon disulphide.

According to age and quality of the oil from 8·14 per cent. to 41·03 per cent. of CS_2 were found; self-prepared oil of mustard contained from 9·82 per cent. to 10·82 per cent., diminishing in a year's time to 2·03 per cent. (one specimen to 0·91 per cent.) of CS_2; the artificial oil averaged 10·78 per cent. The origin of the CS_2 is not definitely made out, but the decomposing effect of steam and the presence of $KHSO_4$, influence its formation; by heating oil of mustard with $KHSO_4$, an increase of CS_2 from 0·45 to 2·29 per cent. was observed. The oil obstinately retains the carbon disulphide, and they cannot be separated completely by distillation. A comparative examination of the seeds of *Brassica nigra* and *Sinapis juncea* was made:

		Brassica nigra p. c.	Sinapis juncea p. c.
Moisture		8·47	7·63
Ash		5·04	4·52
Phosphoric acid		1·84	1·89
Soluble in petrol. spirit	Used in succession	29·37	30·10
„ ether		0·93	1·30
„ abs. alcohol		0·80	1·25
„ 75 p.c. „		6·77	6·40
Nitrogen		4·50	4·21
Sulphur		0·61	0·54
Vol. oil (calcul. from amount of s.)		1·89	1·67

* The name Kulit laban means clove bark, the word Laban or Lawang being probably the Malay pronunciation of the Sanskrit "Lavanga," and of the vernacular Hindostanee "Laung," which is applied to the clove, *vide* 'Pharmacographia,' p. 281.

* From *Schwz. Wochenschr. f. Pharm.*, 1888, 277. Reprinted from the *Amer. Journ. of Pharm.*, November.

EMULSION OF OIL OF CHENOPODIUM.*

BY HARRY JOSEPH MEYERS, PH.G.

The volatile oil distilled from chenopodium, U.S.P., is well known to possess both a characteristic odour and taste. The anthelmintic properties which render this oil valuable, confine its use to the relief of children requiring such medication. The use of capsules for dispensing this oil not being adapted for children the question arises—how can this remedy be disguised, both in odour and taste, so that a practicable and palatable preparation can be dispensed. The form of an emulsion would appear to offer the best means for administration, and a number of experiments were made.

Oil of chenopodium has three distinct features in its taste, each of which is objectionable and which must be disguised or ameliorated. The most repulsive of these is the nauseous effect produced; not less offensive is the bitterness developed; combined with them is a sharp pungency which has an irritating action on the throat. A basic emulsion was prepared and flavouring drugs were incorporated with it. The teaspoonful dose contains about four drops of the oil of chenopodium, which averages 135 drops to the fluid drachm.

℞ Oil of chenopodium	f℥i.
Expressed oil of almond	f℥iv.
Powdered acacia	4 oz., *av.*
Water q.s. ad	Oii.

Mix the oils thoroughly in a dry mortar, add the acacia gradually, rubbing the mixture to a uniform paste. Then add the bulk of the water, and agitate rapidly until a smooth emulsion is formed. Measure the liquid, and add sufficient water to make 1 quart. Mix by agitation. This formula furnishes a milk-white emulsion, rather thinner than some preparations of a similar composition, and, owing to the small quantity of oil present, necessitating less acacia. The emulsion is permanent, does not "crack," and possesses the odour and taste of the oil of chenopodium, but slightly modified.

Mixtures were made of this emulsion with the volatile oils of almond, gaultheria, coriander, staranise, cloves, allspice, lemon and orange peel in various proportions; also with purified extract of liquorice, saccharin, yerba santa and celery seed. None would afford a palatable preparation, but liquorice and celery seed greatly improved the odour and taste, and the following modified formula is suggested, as best meeting the object in view:—

Celery seed	℥ii.
Purified extract of liquorice	℥i.
Powdered acacia	℥v.
Oil of chenopodium	♏xxx.
Oil of almond (expressed)	℥ss.
Sugar	℥iv.
Water q.s. ad	℥iv.

Mix the seed with the extract and reduce to a very fine powder; triturate with sufficient water to form a thin liquid, and strain with expression. Emulsify the mixed oils in a dry mortar, with the acacia and sugar, using a little water if the paste becomes too thick. Finally add the strained liquid and form a perfect emulsion; add water to make the liquid measure four fluid ounces.

The emulsion is a brown liquid, contains in a teaspoonful two drops of the oil of chenopodium, and has but a slight odour and a sweetish aromatic taste which is slightly pungent and cooling. The freshly-prepared emulsion is to be preferred; but samples of it have been kept on hand for about a month, and were found to keep well, and to remain palatable. The addition of a small quantity of alcohol will render it still more permanent.

* Abstract from a Thesis. From the *American Journal of Pharmacy*, November.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 15, 1888.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE CHEMISTRY AND PHARMACOLOGY OF THE NITRITES.

THE series of papers which came under the consideration of the Pharmaceutical Society of Great Britain at its evening meeting on Thursday, at too late an hour to allow of the proceedings being reported *in extenso* in this number of the Journal, not only constituted an invaluable contribution to existing knowledge of an important group of therapeutic agents, but furnished a good illustration of the important service to chemistry and medicine that the Research Laboratory recently established by the Society is capable of rendering. The seven communications then read dealt with different phases of an investigation designed to throw light upon the therapeutic employment of the organic nitrites of the paraffin series. These compounds, as is known, possess a very definite physiological action; but at present they are represented in official medicine only by the Spiritus Ætheris Nitrosi, B.P., and Amyl Nitris, B.P., which are in fact nothing more than very impure—or, at any rate, heterogeneous—solutions, both containing considerable and varying quantities of substances other than nitrites. So evident and well recognized has this been in the case of the former preparation that it has been seriously argued in certain magisterial proceedings that its efficacy as a medicine did not depend on the ethyl nitrite it contained, but on the aldehyd or some other accompanying constituent. The first step towards clearing up this obscurity was taken in the research upon the preparation of pure ethyl nitrite brought under the notice of the Pharmaceutical Society by Professor DUNSTAN and Mr. T. S. DYMOND in April last. On that occasion, the authors mentioned communicated a method of preparing the pure nitrite by the reaction of dilute sulphuric acid with sodium nitrite and alcohol at a low temperature, and described the preparation of a solution of pure ethyl nitrite for dispensing purposes, which if not absolutely stable was at least as satisfactory in this respect as the present official preparation. The next step was to test comparatively the physiological and therapeutic effects of spirit of nitrous ether and such a solution of pure nitrite of ethyl, and this was undertaken by Professor LEECH, of Owens College. As the result of his experiments he has come to the conclusion, communicated in one of the papers read on Thursday evening, that the therapeutic effect of the two solutions is similar, and he therefore recommends that the pure solution, from the use of which a definite result can be anticipated, should replace in the British Pharmacopœia the Spiritus Ætheris Nitrosi and should alone be used by medical men. Incidentally it may be mentioned that Professor LEECH found little difficulty in the preservation of an alcoholic solution of ethyl nitrite, the loss of nitrite during the experiments being relatively trifling.

The official amyl nitrite furnished the material for the other papers, the various nitrites contained in it having been isolated and their physical and chemical properties determined by Professor DUNSTAN and Messrs. E. J. WOOLLEY and W. LLOYD WILLIAMS. The nitrites present in the official preparation have been ascertained to be iso-butyl nitrite and α- and β-amyl nitrite, and one specimen contained also ethyl and propyl nitrites. The iso-butyl nitrite is a compound that has previously been but little investigated and apparently has never before been noticed as a constituent of official amyl nitrite. The α- and β-amyl nitrites, too, have never before been separated from each other, and the process for their separation consisted in first separating the alcohols and then converting them into nitrites. At present only the α-amyl nitrite has been obtained pure. Of course the source of all the impurities met with in amyl nitrite is the fusel oil used in its preparation, and enough was said to suggest the necessity for a more precise definition in the Pharmacopœia of the amylic alcohol from which the nitrite is to be prepared. In addition to the constituents mentioned, the commercial representatives of the official preparation invariably contain a considerable percentage of products that do not come within the class of nitrites at all. The physiological action of the nitrite compounds is being investigated by Professor CASH, but at present the investigation is not sufficiently advanced to allow of definite statements being made respecting it. So far, however, as may be judged from the results of experiments upon animals there is considerable difference in physiological action between the iso-butyl nitrite and a mixture of the two amyl nitrites. This alone would furnish an explanation quite sufficient to account for some of the variability in results which has occasionally been observed when amyl nitrite has been used medicinally. In order to determine whether the substances other than nitrites which are contained in official amyl nitrite possess any therapeutic value Dr. LAUDER BRUNTON has compared the action of the pharmacopœial liquid with that of the two pure amyl nitrites, and found that there is a marked difference in their action.

From the foregoing brief account of the research which formed the subject of the papers read on Thursday evening, it will be seen that it is of a type that promises to exercise an important influence upon the future of pharmacy. The preparation of pure compounds of known constitution and properties, and the determination of their physiological action, are essential preliminaries to the establishment of therapeutics upon a scientific basis. The chemical and pharmaceutical portion of this work will be exacting, and perhaps tedious, but there is no reason to believe that the pharmacists will be found lacking in their share of it, if only on account of the consideration that their best prospects lie in the direction of more exactitude in therapeutics. Everything that tends to lift the administration of medicine out of the reach of the crudities by which it is still so largely influenced must redound to their benefit. The demand by the medical practitioners of the future for more exact weapons with which to combat disease will involve the necessity for greater skill and scientific knowledge in those who aspire to prepare and deal in them, and it must, therefore, tend to the ultimate advantage of the class whose training has had that special object in view. The particular preparation —nitrite of amyl—that constituted the starting point of the investigation furnished a good illustration of the manner in which the best physiological work, and consequently the wisest therapeutic treatment, may be vitiated by ignorance of the actual composition of the substance used. In the discussion that followed the reading of the papers Professor Michael Foster humorously referred to the disadvantage under which the physiologist laboured through the prevalent "uncleanness of reputable drugs," and he and Professor Burdon Sanderson, Dr. Lauder Brunton, and Dr. Armstrong, all spoke warmly of the value of such researches as those of Professor Dunstan and his colleagues.

Notice has been given in the House of Commons, by Mr. Picton, that on Friday he will ask the Home Secretary whether his attention has been called to the numerous cases of poisoning by carbolic acid; whether the Pharmaceutical Society has expressed an opinion that carbolic acid should be placed among poisons within the purview of the Pharmacy Act; whether a memorial has been addressed by the municipal authorities of Liverpool to the Privy Council, urging the desirability of restricting the sale of carbolic acid; and whether the Government intends to take any action in the matter.

* * *

According to official returns, recently issued, the number of candidates for the pharmaceutical qualification who presented themselves before the examining boards for the kingdom of Prussia during the year 1887–88 was 264, and of these 36 presented themselves for the second time. Out of the 264 not less than 241 passed, or 91 per cent.; 58 "satisfied" the examiners, whilst 145 were described as good and 38 as very good. The effect of a systematic course of study upon the training of students is well illustrated by this high percentage of passes.

* * *

The report of the Government Botanist on the Botanic Gardens in the Nilghiris for the year 1887–88 contains some notes of interest respecting medicinal plants. It would appear that satisfactory progress is now being made with the ipecacuanha acclimatization experiment, since the number of plants has increased to about 4000. Only three died out of 500 that were planted out last year, and the remainder are described as being in a vigorous condition. Instructions for the cultivation and propagation of the plant have been printed and circulated, and it is intended to distribute about 2000 well-rooted plants, free of cost, to private planters during the present season. The air-dried stem and root of *Naregamia alata*, or "Goanese ipecacuanha," have been the subject of further therapeutic trials by Surgeon-General Bidie (see *Pharm. Journ.*, [3], xviii., 317), who reports that on the whole the results have been satisfactory and such as to encourage the further use of the drug. It is thought probable that in mild cases of dysentery the indigenous remedy may be used to supplement the true ipecacuanha. Specimens of *Naregamia alata* have therefore been planted with the view of testing its rate of growth. Between 5000 and 6000 jalap tubers have been put down in the Medicinal Garden at Dodabetta, together with several thousand cuttings, but it is not expected that any appreciable crop will be harvested before the winter of 1889 or 1890. It is also mentioned that a quantity of bark which was sent to the London market under the name *Michelia Nilagarica* was wrongly described, an examination of the leaves of the trees from which it was taken having shown the botanical origin to be *Gordonia obtusa* and *Cinnamomum Wightii*.

* * *

An interesting possible utilization of cocoa-nut refuse is also referred to in this report. It has been found that if the refuse be subjected to pressure while yet moist, the natural viscidity causes it to cohere to form a mass resembling "millboard." This substance is so hygroscopic that if a puncture be made in it while in contact with water the adjacent parts immediately absorb so much water that the orifice is closed by the consequent expansion. It has been found that in this way the orifice caused by the firing of a bullet nearly an inch in diameter through a $\frac{3}{4}$-inch plate of the refuse, sustaining a head of one foot of water, was stopped so quickly, that although a large jet at first spirted through, this decreased in volume in a few seconds, and in less than a minute had ceased entirely. It is suggested that this property might render the material valuable as a backing to the armour of ships.

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The next meeting of the Chemical Society will be held on Thursday, December 20, at 8 o'clock.

* * *

The Edinburgh Chemists' Ball is to be held in the Masonic Hall, George Street, Edinburgh, on Thursday, the 17th of January. Particulars and tickets may be obtained from the Convener, Mr. J. P. Thomson, 139, Princes Street.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 5th instant.

Present—The President, Mr. James E. Brunker, M.A., in the chair. The Vice-President (Mr. Draper), Messrs. Allen, Hayes, Charles Evans, Merrin, Beggs, Grindley, Dr. Collins, Simpson and Dr. Montgomery.

Letters were received from Dr. Tweedy, Dr. Whitla, and Mr. Harry C. Draper, thanking the Council for having re-elected them Examiners.

A letter was received from the Secretary of the City of Dublin Technical Schools, asking for the decision of the Council upon the application made to them at their meeting in March last to recognize the chemical laboratory there as a school, certificates of attendance at which would be recognized by the Society.

The Registrar was directed to reply, that at as early a date as possible the school would be inspected by a committee.

A letter was read from Mr. E. McCreery S. Hill, M.P.S.I., of 5, Donone Place, Dublin, dated November 28, in which he called attention to the following facts:—Each candidate for the conjoint diplomas of the Royal College of Surgeons, Ireland, and the Apothecaries' Hall of Ireland, is required before admittance to his "first professional" examination, to present, besides other certificates, one of having been engaged in practical pharmacy for a period of three months. On October 25 he attended at the College of Surgeons for the purpose of entering his name for the examination to be held on November 5, 6 and 7. His pharmacy certificate was one signed by a member of the Council of the Society, Mr. William Hayes, and stated that he had been in his establishment as apprentice and assistant for a term of almost ten years. Dr. Jacob, under the instructions of the Apothecaries' Hall, refused this certificate because it was not signed by a licentiate apothecary, and referred him (Mr. Hill) to Dr. Montgomery as Secretary of the Apothecaries' Hall. He brought the matter before a Board meeting of the Hall on the following day, when Mr. Hayes's certificate was, the writer believed, unanimously rejected, although it was known that he held the diploma of the Society. He petitioned the Committee of Management under the conjoint scheme, who held a meeting on November 1, stating that he had had his name placed on the Medical Students' Register under date of November, 1879, that he held the diploma of the Pharmaceutical Society, and that he had been engaged in practical pharmacy for close on fifteen years. He received permission to present himself for examination "on the condition that at his next examination he produced a certificate stating that he had been learning pharmacy in a school of pharmacy or from a licentiate apothecary for a period of three months." As he did not wish to lose six months he agreed to the condition, presented himself for the examination, and passed. "So that it will now be possible," Mr. Hill continued, "to see a licentiate and member of your Society forced by the Apothecaries' Hall of Ireland to go through the form of learning the pharmacy required by a first year's medical student. I do not write this on my own behalf, because my promise in the matter has been given, and I certainly shall not seek to alter it; but it is a serious one for the licentiates of the Society who, I know, are not aware that the Apothecaries' Hall of Ireland will not—and I believe it is the only medical body in the world which will not—receive a pharmacy certificate from a pharmaceutical chemist."

The President: Is it a fact that the license of the Society is not accepted as evidence of a man having put in "three months of practical pharmacy?" If so, it is very extraordinary.

Dr. Montgomery: The rule established under the conjoint scheme since last November twelve months, is that there must be a certificate of "three months practical pharmacy in a clinical hospital, or in a school of pharmacy, or in the compounding department of a licentiate apothecary."

Mr. Hayes: Is not this an extraordinary thing, considering that the Pharmaceutical Society of Ireland is the principal pharmaceutical body here, and that we require four years to be spent in the study of practical pharmacy in a way very different from what is required by that three months rule?

The Vice-President: One would like to believe that there is some misapprehension about this; but if it has been done surely Dr. Collins and Dr. Montgomery know why a society of which they are honoured members has been left out of the arrangements?

Dr. Collins: I was going to tell you why. The chief reason why that rule was passed was this—that a young man intending to go to the medical profession should be encouraged to become an apprentice to a general practitioner such as an apothecary, where he would learn a good deal about children's diseases and ordinary diseases which would be most important to him in his future career. He would have no such opportunity as that in the establishment of a pharmaceutical chemist; and therefore it was considered desirable that every encouragement should be given to young men to become apprentices for say twelve months to a licentiate apothecary.

The President: Your rule speaks of a "clinical hospital or a school of pharmacy." How many cases of children's diseases would a student see in your school of pharmacy? The only thing we can do with this letter is to refer it to a committee. It is a very serious matter, and I think a very serious breach of the privileges of this society, that a man who according to our regulations must have served at least four years at practical pharmacy, should be refused admission to an examination which only requires three months in a school of pharmacy. I really think we cannot allow this to pass unchallenged.

Dr. Montgomery: There is no direct connection between the Pharmaceutical Society and the medical bodies.

Mr. Allen: It is an insult. There is no other word for it.

The Vice-President: An insult of which two members of this Council were cognisant.

Mr. Hayes: I think Dr. Collins and Dr. Montgomery both feel the weakness of their arguments, and that it is a deliberate slight upon the Pharmaceutical Society.

Dr. Collins: I have told you what happened.

The President: I think we had better refer this matter to a committee.

Mr. Allen: I think that members of the Apothecaries' Hall who do such a thing should not sit on our board.

Dr. Collins: Well I beg to resign my position on the board if you think it right.

The President: Any opinions on the matter should not be expressed so decidedly on short notice. I think it is a thing to be considered by a committee and reported upon.

Dr. Montgomery: The plan I would advise you to adopt would be that the Council should send in a memorial.

The President: We will do nothing of the sort until we ascertain the facts of the case. We can only do that by referring the matter to a committee. When that committee reports it will be for the Council to take what steps they think fit.

Dr. Collins: That gentleman who wrote the letter had the rule before him.

The President: But we object to the rule as a breach of our privileges.

Dr. Collins: That is a different thing. You have a right to do anything you consider right as to getting the rule rescinded: but that gentleman had the rule before him, and if he acted without coming forward beforehand to ask was it absolutely necessary to comply with it, he has nothing to say for himself.

Mr. Hayes: I think, Dr. Collins, it would have been contrary to common sense for him to do any such thing. He felt that he had a far stronger position than your rule required. He had served an apprenticeship of ten years, and he had received the certificate of this Society which required four years' study of practical pharmacy.

Dr. Collins: I give you in my resignation now, on account of the unfriendly spirit in which this matter has been spoken of.

The Vice-President: There is none, sir. No gentlemen sitting at this table are more honoured than the two members of the Apothecaries' Hall who are here.

Dr. Collins: On account of the way in which the matter has been spoken of I resign my position here now; and I may say that I was not one of those who were very anxious—or anxious at all—that the rule should be carried out; but it having been carried out, I am not going to be spoken of in that way.

The Vice-President: Please, Dr. Collins, do not say that you will do anything yet.

Dr. Montgomery: It is the result of the deliberations of the Board of the Apothecaries' Hall; and why we should tell this body that such a thing would be carried out I do not see.

The Vice-President: It would have been a very friendly thing.

Dr. Montgomery: I did not look at it in such a light at all. I did not think we were doing any harm. I think we were not bound to state anything about it here.

The Vice-President: A great slur has been cast on the competence of our men of whom Dr. Montgomery himself has been in the position of examiner in practical pharmacy.

Dr. Montgomery: The Apothecaries' Hall is a medical body. This is a pharmaceutical body. The Apothecaries' Hall has never accepted any other certificate than one from a licentiate apothecary as long as I have been connected with it.

The President: Is it not absurd on the face of it that a man who produces a certificate that he has been for four years engaged in practical pharmacy should, after he has got the license of this Society, be compelled to go elsewhere to get a three months' certificate? It is perfectly absurd and monstrous.

Mr. Hayes: We would have been satisfied if Dr. Montgomery and Dr. Collins had opposed the passing of such a rule, leaving us out in the cold.

The President: The only way now is to refer it to a committee. We cannot decide on such a matter now.

Mr. Collins then withdrew from the Council room, and was followed by Dr. Montgomery.

The President: I am sorry for Dr. Collins; but I think that a rule a year old being sprung on us in this way is monstrous.

The Registrar was directed to write to Mr. Hill acknowledging his communication with thanks.

Mr. Hayes moved that a committee consisting of Messrs. Grindley, Evans, and the mover and seconder of the resolution be appointed to consider the subject of the rejection of Mr. Hill's certificate by the Apothecaries' Hall.

Mr. Allen seconded the motion, which passed unanimously.

A letter from Mr. Martin R. Nugent, 131, George Street, Limerick, stated that in October, 1875, he passed the examination of the Apothecaries' Hall, and he held their certificate. Immediately afterwards he entered the Queen's College, Cork, attended lectures in anatomy, physiology, zoology, botany, elementary chemistry, natural philosophy, and modern languages, and obtained certificates accordingly. After leaving the college, he bound himself to the compounding business in Limerick, and had been compounding and dispensing medicines since. He could produce certificates from every doctor in the city as to the accuracy and dispatch with which he could compound; and he now asked to be allowed without further preparation to present himself for the final examination of the Pharmaceutical Society.

The President: We have no power to grant the request made in this letter. The substitute which is proposed does not meet our requirements.

On the motion of the President, seconded by Mr. Allen, Mr. Robert Armstrong, of Cootehill, and Dr. John Smallwood Ward, of Lisburn, were elected members of the Society.

The Council then adjourned.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The third meeting of the eleventh Session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on Wednesday, November 28, at 9.15. p.m., Mr. George Coull, President, in the Chair.

The minutes of last meeting having been read and approved, the Chairman called upon the Secretary to read the following communication on—

New Remedies.

BY A. RUSSELL BENNET.

Consequent on the rapid advance of chemical science new products are being discovered almost daily, and some of these, after having undergone careful physiological investigation, are introduced into medicine. It is to the more important of these that I now propose to refer in a brief and summary manner. The first to which I will refer is—

Acetanilid. — Acetanilid, antifebrin or phenylacetamide $C_6H_5.C_2H_3O.NH$.—is prepared by the action of acetic acid on aniline thus:—

$$C_6H_5NH_2 + HC_2H_3O_2 = C_6H_5NH.C_2H_3O. + H_2O.$$

Aniline Acetic acid Phenylacetamide.

The manufacturing process is as follows:—

Aniline is boiled with excess of acetic acid for one or two days, and the acetanilid is then distilled off and crystallized from benzol or boiling water. The pure product boils at 295° C. It is insoluble 1 in 189 parts of water at 6° C and more soluble in alcohol and ether.

Like other drugs these new remedies are apt to contain impurities, and tests are sometimes provided for their detection. Acetanilid, for instance, sometimes contains aniline, due to imperfect purification, and a sample so contaminated may produce effects other than those intended by the prescriber. The presence of aniline may be detected by the following test:—Triturate a few crystals of acetanilide with water in a mortar, and add a few drops of solution of hypobromite of sodium. If the sample is pure, the solution will remain limpid and yellow, but if it contains the least trace of aniline a deep orange precipitate will be thrown.

Acetanilid is prescribed as a febrifuge in doses of from 2 to 10 grains. The following is said to be a good form for its administration as a mixture:—

℞ Acetanilid	℥j.
Syrupi	℥j.
Sp. vini gallici	ad ℥vj.

Owing to its insolubility in water, however, it is seldom prescribed in the form of mixture. The pill is much more satisfactory, and may be conveniently made by using glycerine of tragacanth as an excipient.

The name antifebrin is objectionable on account of its similarity to the name of the analogous compound antipyrin, and it is, moreover, unnecessary when we have so suitable a name as acetanilid.

Antipyrin.—Antipyrin, or dimethylchinizin, belongs to the class of artificial alkaloids, and was first prepared by Dr. Knorr of Munich. It is described as one of a series of derivatives from a hypothetical base called "chinizin," represented by the formula $C_9H_{10}N_2$. These derivatives are produced by the action of diacetic ether on one of the hydrazines, a class of bodies represented as containing the N group $=N-N=$ of which the free affinities are saturated either by hydrogen or alcohol radicles. Phenylhydrazin is obtained by the reduction of diazobenzene sulphonate by sulphurous acid. When equivalent molecular weights of it and diacetic ether react in the cold the elements of water are eliminated, and the residue combines to form phenylhydrazin-diacetic ether. This, when heated to 100° C., loses the elements of water, and is converted into methychinizin, thus:—

$$\underset{\text{Phenylhydrazin}}{C_6H_5N_2H_3} + \underset{\text{Diacetic ether}}{C_6H_{10}O_3} = H_2O + C_2H_6O + \underset{\text{Methyloxychinizin.}}{C_{10}H_{10}N_2O}.$$

Methyloxychinizin possesses both acid and basic properties. It still contains a hydrogen atom, and when this is replaced by an alcohol group the resulting product is found to act only as a base. This conversion may be effected by heating in a tube a mixture of methyloxychinizin, methyl iodide, and methyl alcohol; decolorising the product by boiling with sulphurous acid, distilling off the alcohol, treating the residue with strong soda ley, shaking the heavy oil that separates with ether and evaporating the ethereal solution. Dimethyloxychinizin, ($C_{11}H_{12}N_2O$) separates in lustrous crystals which melt at 113° C. This is the substance to which Dr. Knorr has given the name antipyrin. I have never heard of its containing any impurity.

Antipyrin is largely used and is a very popular agent for reducing bodily temperature. It was at one time highly lauded as a cure for headaches from whatever cause arising, but I have not heard of any satisfactory permanent results. It has also been recommended as a remedy for sea-sickness on long voyages, but here also the evidence is conflicting. On a recent voyage from Germany to London the passengers took a dose of 1 gram, some before going on board, and others after embarking, and the dose was repeated at intervals. Next day out of 150 passengers only 25 appeared at dinner, the remainder being seasick. It was evident, therefore, that the antipyrin had failed.

The dose is from 1 to 30 grains in powders or mixture, as it is very soluble in water. It can be made into pills by adding a little tragacanth and water. From a recent report it appears that it should not be prescribed with spiritus ætheris nitrosi, as poisonous compounds are thereby produced.

Sulphonal.—This is our newest hypnotic, and is receiving a large amount of attention at the present time. The name is a very short and convenient substitute for its chemical one diethyl-sulphon-dimethylmethane. Its chemical history and constitution has been worked out by Baumann and Fischer.

When absolute alcohol and aldehyde are brought together under certain conditions the elements of water and acetal are formed. If, instead of alcohol, a mercaptan is used (that is thio-alcohol in which the HO group is replaced by SH.), C_2H_5SH, a definite compound is obtainable either with aldehyde or acetone.

When hydrochloric acid gas is passed through a mixture of mercaptan and acetone in the proportion of two molecular weights of the former to one of the latter, the following reaction takes place:—

$$\left.\begin{matrix}CH_3\\CH_3\end{matrix}\right\rangle C=O + \left\{\begin{matrix}HSC_2H_5\\HSC_2H_5\end{matrix}\right. = \left.\begin{matrix}CH_3\\CH_3\end{matrix}\right\rangle C\left\langle\begin{matrix}SC_2H_5\\SC_2H_5\end{matrix}\right. + H_2O.$$

The product is a liquid insoluble in water. It is treated with permanganate solution, by which the S of the mercaptan group is oxidized to SO_2. The liquid is heated on a water-bath and filtered while hot. On cooling the new compound diethylsulphon-dimethylmethane separates and is purified by recrystallization from hot water or alcohol. It may be represented as methane, in which the four hydrogen atoms have been replaced by two methyl groups and two ethylsulphon groups, thus:—

$$\left.\begin{matrix}CH_3\\CH_3\end{matrix}\right\rangle C\left\langle\begin{matrix}SO_2C_2H_5\\SO_2C_2H_5\end{matrix}\right.$$

Sulphonal occurs in heavy prismatic crystals, which are colourless, odourless and tasteless, and melt at 130° to 131° C. It is soluble 1 in 100 of water and readily in alcohol.

The dose is from 15 to 30 grains, and one peculiarity of the drug is that it does not act until five or six hours after being taken. This is said to be due to its sparing solubility and consequent slow absorption into the system. It is coming into use as a hypnotic, and on account of its sparing solubility in water is mostly prescribed as powders. It can be dispensed in mixture form suspended by tragacanth or acacia mucilage.

Phenacetine.—Phenacetine, or paracetphenethidine, has the formula $C_6H_4\left\langle\begin{matrix}OC_2H_5\\NHC_2H_3O.\end{matrix}\right.$ The process of manufacture consists of five stages:—

1. Treatment of phenol by nitric acid.
2. Separation of the nitrophenols.
3. Treatment by an ethylic compound.
4. Reduction by hydrogen.
5. Treatment by an acetyl compound.

These have been so recently described in the *Pharmaceutical Journal* that it seems unnecessary to repeat them here.

The dose of phenacetine is from 8 to 20 grains. It is coming largely into use as an antipyretic, and produces no disagreeable after-effects. In cases of neuralgia it has proved very efficient. It is almost insoluble in water, and consequently is best given in the form of powders.

Sozoiodol.—This is described by the maker as di-iodoparaphenol-sulphonic acid, having the formula—

$$C_6H_2I_2\left\langle\begin{matrix}OH\\SO_3H.\end{matrix}\right.$$

The acid sodium salt $C_6H_2I_2SO_3Na(OH)+2H_2O$ is freely soluble in water and glycerine, but the corresponding potassium salt is only slightly soluble. The neutral potassium salt is soluble in 12 or 13 parts of water and in glycerine. Sozoiodol has been introduced as an antiseptic in skin diseases, etc., as a substitute for iodoform. Zinc sozoiodol occurs in small transparent crystals and mercury sozoiodol as a yellow amorphous powder. There has not been sufficient time as yet to prove the value of this remedy.

Bismuthi Iodidum.—This substance is not exactly new, but is rather an old compound, for which a new use has been suggested. It occurs as an amorphous powder of a dark brick-red colour, and exceedingly light, differing from other bismuthi salts in this respect.

It may be prepared as follows:—

Take of—

Bismuth. subnitrat.	306	parts.
Potass. iodid.	105·6	,,

Triturate with sufficient hydrochloric acid to form a thin paste, which becomes yellow. Throw this into water, by which the reaction is completed and a brick-red precipitate is thrown down.

Bismuth iodide is used as an antiseptic dusting powder in place of iodoform where the heavy smell of

the latter is objectionable. It is also sometimes prescribed as an ointment in the proportion of 1 drachm to 1 ounce of vaseline.

Anthrarobin.—Professor Liebermann, about nine years ago, pointed out that Goa powder consists chiefly of chrysarobin, easily converted into chrysophanic acid by oxidation. These two names are very commonly confounded, and what really takes place during oxidation may be represented as follows:—

$$C_{30}H_{26}O_7 + 2O_2 = 2C_{15}H_{10}O_4 + 3H_2O.$$

Liebermann attempted to obtain chrysarobin by the reduction of chrysophanic acid, but failed, the reduction yielding a product in which two atoms of hydrogen simply replaced one of oxygen. Like chrysarobin, the new compound was found to absorb oxygen readily when in alkaline solution, chrysophanic acid being formed. He then reduced colouring substances belonging to the anthracene group, such as alizarin and flavopurpurin, and found that they yielded similar reduction products, all of which are readily reconvertible into the original substance by atmospheric oxidation in solution. To these reduction products he gave the name "anthrarobin." The manufacturing process is as follows:—Boil commercial alizarin or purpurin with zinc dust and ammonia solution, filter off the solution into hydrochloric acid; collect, wash and dry the precipitate.

Anthrarobin occurs as a yellowish-white powder, and is fairly stable. It is insoluble in water, but soluble in alkalies. In one notice it is said to be not quite so active as chrysarobin, and does not produce any inflammation on the cuticle. A later notice was to the effect that it possessed no activity, even when taken by the mouth.

Pyrodine.—This is perhaps the newest antipyretic, and as yet comparatively little is known about it. It is said to be acetylphenylhydrazine ($C_6H_5N_2H_2.C_2H_3O.$), and occurs in the form of a white powder, sparingly soluble in water. The dose is from 3 to 4 grains for children, and from 8 to 12 grains for adults. It is said to act more quickly and powerfully than other antipyretics, and does not produce nausea or vomiting.

The paper was illustrated by specimens of the new remedies kindly lent by Messrs. Boa and Robertson and Co., George Street.

The next communication was a--

Report on Commercial Tincture and Liniment of Iodine, Potash Water and Liquid Ammonia.

BY JOHN FINDLAY.

Twelve samples of each were examined. Tincture of iodine showed generally satisfactory results, as may be seen from the following summary:—

	Density.	Iodine. grs. per oz.	Iodide of Potassium. grs per oz.
Theory requires. .	861	10·93	10·93
Highest found . .	883	23·05	16·42
Lowest found. . .	853	8·14	5·31
Average	861·42	11·84	10·48.

The sample containing 23·05 grains iodine in each ounce was evidently intended for the old Edinburgh Pharmacopœia tincture (27·43 grs. to 1 oz.), but differed from it in containing potassium iodide.

The liniment showed less satisfactory results:—

	Density.	Iodine. grs. per oz.	Iodide of Potassium. grs. per oz.
Theory requires. .	948	54·62	21·87
Highest found . .	939	52·83	21·39
Lowest found. . .	882	14·81	7·26
Average	919·42	40·67	16·97.

One sample of tincture and three of liniment were found to have been made with methylated spirit, and consequently evolved a noxious irritating odour.

The liquid ammonia showed fairly good results. Apparently the samples had in most cases been made by diluting strong ammonia having a density of ·880 instead of ·959, as required by the Pharmacopœia. In one instance strong ammonia was supplied when liquor ammonia was asked for.

Of the potash water samples, three contained no potassium bicarbonate. Of the other nine the highest contained 22·3 grains to the pint, and the lowest 2·4 grains. Chlorides and traces of lead were present in most samples, and apparently distilled water was not generally used.

The reading of the papers was followed by a discussion, taken part in by Messrs. Boa, Bowie, Coull, Duncan, Hill, Lunan and Merson, and on the motion of the Chairman, a cordial vote of thanks was awarded to the authors.

The Chairman intimated that the next meeting would take place on December 12, and the meeting then closed.

The Annual Conversazione.

The annual conversazione took place in the large hall of the Literary Institute, South Clerk Street, on the evening of Friday, December 7, at 8.30.

During the first hour there was an exhibition of new and interesting drugs and chemicals by various firms. By means of a large collection of microscopes lent by members and friends a number of sections of animal and vegetable tissue and minerals, and also living animals and plants showing circulation of the blood, cyclosis of protoplasm, etc., were exhibited. An exhibition of electrical apparatus by Fleming and Co., Teviot Place, attracted a large share of attention. At nine o'clock the phonograph was shown in operation, but owing apparently to the size of the hall only about two words out of a sentence could be heard. Later in the evening it was very successfully shown in one of the smaller halls.

During the second hour the chair was taken by Mr. George Coull, President, who was accompanied to the platform by Mr. William Gilmour, Chairman of the Executive of the North British Branch, Mr. Peter Boa, Mr. C. A. Macpherson, Mr. William Taylor, Vice-President, and members of committee.

The Chairman intimated apologies from Messrs. William Ainslie, William Aitken, J. B. Stephenson, Chairman of the Scotch Board of Examiners, and Provost Watt, Haddington, Vice-Chairman of the Executive of the North British Branch.

In a few introductory remarks he welcomed the large company of friends who had come to join in the annual gathering, and referred to the fact that the Association was at present in the midst of what promised to be a very successful session.

The remainder of the hour was very agreeably spent in listening to an excellent programme of songs and recitations contributed to by Misses Maggie Anderson, and Aggie Macdonald, and Messrs. R. K. Degs, A. N. Duncan, and J. Whyte, Miss J. W. Gordon acting as accompanist. On the motion of the Chairman a hearty vote of thanks was awarded to the contributors with acclamation, and on the motion of Mr. Gilmour, a similar vote of thanks was awarded to the Chairman.

Under the management of Mr. C. F. Henry, a dance programme, taken part in by about sixty couples, was then proceeded with, the end coming all too soon at 4 a.m.

As on former occasions the platform was tastefully decorated with plants kindly lent by James Buchanan, Esq., and Messrs. Baildon and Son, Duncan, Flockhart and Co, Mackay and Co., Jas. Robertson and Co., and T. and H. Smith and Co. sent an ample supply of aerated waters.

MANCHESTER PHARMACY STUDENTS' ASSOCIATION.

A meeting was held at the Blackfriars Hotel on the night of Thursday, November 29, Mr. W. Elborne, President, in the chair.

Mr. W. Gibbons gave a brief review of the recently published work, "The Art of Dispensing," speaking extemporaneously from short notes.

The paper was listened to with great attention, and at the close a hearty discussion followed, after which a unanimous vote of thanks was accorded the author.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The Council of this Association met on Wednesday of last week at the Mason College, under the presidency of Mr. G. E. Perry, when the following resolution was passed:—"That the best thanks of the Association be tendered to the Mason College authorities for their kindness in allowing the Association to hold their meetings at the College, and for the privilege of placing their library and museum there; and that the sum of three guineas from the Association be subscribed annually to the College."

The sub-committee appointed to make arrangements for the annual ball met at the Colonnade Hotel on Monday, when it was decided to hold the ball this year at the Edgbaston Assembly Rooms, and not at the Town Hall, as in previous years.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The annual dinner in connection with this Society was held at the Masonic Hall on Wednesday evening, the 5th inst., the President, Mr. Councillor Fitzhugh, J.P., in the chair.

There was a good attendance of members and friends, and the proceedings were interspersed with songs, glees, etc., and altogether a most enjoyable evening was spent.

The usual loyal toasts having been duly honoured, Mr. S. V. Holgate, in a suitable speech, proposed the "Pharmaceutical Society," coupling with it the name of Mr. W. H. Parker, the Local Secretary for Nottingham and Vice-President of this Association.

Mr. Parker responded in a humorous style, and expressed a hope that more gentlemen would join the Society, and elect men on the Council who would be more in harmony with themselves.

"Continued Success to the Nottingham and Notts Chemists' Association" was proposed by Professor Clowes, who said he had been connected with it for the past six or seven years. The Association deserved every success, owing to the excellent courses of training it provided for the young men connected with it, and might be regarded as an important educational Society, for in this respect it was doing a most useful work. He coupled with the toast the name of the Chairman.

The Chairman expressed a hope that the Association would continue to flourish as hitherto. The twelve members on the Committee included six who had been brought up under its influence, and it would be a great satisfaction to all concerned to know those six gentlemen now occupied prominent positions as chemists in the town. They owed much to Professor Clowes, inasmuch as he had been the chief cause of the success attending the Association during the past few years.

Mr. J. Wilford (Treasurer) and Mr. W. Widdowson (Hon. Secretary) also responded, the latter referring to the advantages which many young men had derived through being connected with their Association.

Mr. C. A. Bolton proposed the "Professor and Teachers of the Classes," observing it was twenty years ago since the Society was first started in its present form. The principal object the founders had in view was educational raising of young men in the business represented, in accordance with the Pharmacy Acts, 1868. He submitted various statistics to show the growth of their work.

Professor Clowes, in responding, explained that he wished to give the students so complete a course of study that there would be no need for them to go elsewhere for their training.

Mr. Corr, B.A, the teacher of the botany class, also replied to the toast, alluding to the work the classes had undertaken, and to the zeal displayed by its twenty-seven members in respect to their studies.

Alderman Witty (Hull) proposed "The Town and Trade of Nottingham," to which Mr. Roberts Jackson responded in suitable terms; after which "The Visitors" was proposed by Mr. F. Lumby, coupled with the names of Mr. Francis (Nottingham), Mr. Marshall (London), and Mr. Parker (Rotherham), who all suitably responded.

Due recognition having been made of the services of Mr. W. Gill, who is voluntarily superintending the pharmacy class held at the Society's rooms, Mr. W. H. Parker proposed the health of the President, eulogizing the efficient and kind manner he had always performed his duties.

The toast was drunk with musical honours, and was acknowledged by the Chairman.

LIVERPOOL CHEMISTS' ASSOCIATION.

The ninth general meeting of the thirty-ninth session was held at the Royal Institution on Thursday evening, December 6. The Vice-President, Dr. Symes, in the chair.

The minutes of the previous meeting were read and confirmed and several donations announced.

Mr. A. Villar was elected a member of the Society.

The Chairman exhibited a drop-catching appliance for converting an ordinary shop bottle into an oil, syrup or glycerine bottle. He stated it was of German manufacture, but would, no doubt, be soon obtainable in this country should there be a demand for it. Being made of block tin it possessed the advantage of not readily becoming broken, and it was not acted on by ordinary syrups, etc. It was a cheap and useful appliance which he thought deserved attention.

Mr. Conroy thought it a very useful and well-designed invention, and Mr. J. S. Ward said that personally he was indebted to Dr. Symes for having introduced it to the notice of the meeting. The ordinary oil bottles are very expensive, and only recently he had considerable labour in converting a number of wide-mouthed bottles into oil bottles. Certainly in future he should take advantage of this arrangement.

Mr. Richard Parkinson drew attention to the present controversy *re* "aqua menthæ," and said that notwithstanding what had been written upon the subject he should be very glad to have the opinion of the President, as he had always dispensed aqua menthæ piperitæ when aqua menthæ was ordered, but he saw that several considered aqua menthæ viridis to be the correct thing.

The Chairman, in reply, stated that as a dispenser in a first-class house he had always dispensed aqua menthæ viridis when aq. menthæ was ordered, and it was the rule in his business to do the same; but after the evidence which had been obtained recently by the *Chemist and Druggist* on this question, it became doubtful whether they should not change their practice in this respect.

Mr. M. Conroy said he was of opinion that when doctors ordered aqua menthæ they signified peppermint water.

Mr. J. S. Ward said that until he saw the present

discussion upon the subject he had never any doubt but that the term "aqua menthæ" signified aq. menthæ viridis, and had always seen this dispensed. He was quite astonished to find that so many doctors and chemists were of opinion that it signified peppermint water, and he was at a loss to know how they came to this conclusion, seeing that the term has been officially applied to the water prepared from spearmint, but never to that prepared from peppermint; and he contended that just as a dispenser is expected to translate extractum aloes into extractum aloes socrotinæ, and bismuthum album into bismuthi subnitras, simply because these names have been officially applied to these substances, so he is bound to translate aq. menthæ into aqua menthæ piperitæ for the same reason, unless he is acquainted with the writer of the prescription, and knows that he intends something else.

The Chairman now called upon the Honorary Secretary (in the absence of the author, Mr. F. A. Brown) to read a paper on "Weather Science."

The paper was a very interesting one, treating of the principles of the science of meteorology, and at the close the Chairman said the Association was indebted to Mr. Brown for his communication. Mr. Brown had on several occasions read papers before the Association, and he was sorry that he was not able to attend and read the paper himself, as there were certain points on which the Chairman would have been glad of further information, especially with regard to weather prognostications.

A vote of thanks, proposed by Mr. R. Parkinson, seconded by Mr. W. Wellings, and supported by Mr. J. S. Ward, was unanimously accorded to Mr. Brown, and the meeting terminated.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, December 6, Mr. W. Crookes, F.R.S., President, in the chair. A number of certificates were read for the first time and several persons were elected Fellows of the Society.

The following papers were read:—

A Method of determining Vapour-density, applicable at all Temperatures and Pressures. By WILLIAM BOTT, Ph.D., Berkeley Fellow of Owens College.—The apparatus consists of a large Victor Meyer's bulb, carrying a detachable head-piece, which can be connected with the air-pump. The neck of the bulb communicates with a mercury pressure-gauge, which again is connected with a wide measuring tube attached to an adjustable mercury reservoir. The experiment is conducted as follows. The substance having been placed in the head-piece of the vessel, the latter is heated until the volume has become constant. The apparatus is then exhausted as far as may be requisite, and the reservoir so adjusted that the graduated measuring tube is filled with mercury. The pressure indicated by the gauge having been carefully noted, the substance is allowed to drop into the hot part of the vessel, and the surplus pressure produced by its evaporation is removed by drawing off an equivalent volume of air into the measuring tube until the initial pressure in the gauge has been restored. From the volume of gas measured in the graduated tube, the density referred to hydrogen is obtained by the formula—

$$d = 8484893 \frac{S(1+0{\cdot}00367t)}{VP}.$$

S = weight of substance; V = volume of gas in measuring tube; P = pressure of gas in measuring tube; t = temperature of gas.

Some Derivatives and new Colouring Matters of α-Pyrocresole. By WILLIAM BOTT, Ph.D., and J. BRUCE MILLER.

Berberine. By W. H. PERKIN, jun.—Several analyses of the base and also of its chlorhydride showed that these substances were not adapted to the purpose on account of their containing water of crystallization which can only partially be removed by dehydration: a fact which has been previously noticed by other chemists. Berberine appears to crystallize with 5 to 5½ mol. props. of water, 2 of which remain when the substance is dried at 100° till constant. Berberine chlorhydride, dried over sulphuric acid in a vacuum at a temperature of about 40°, has the formula $C_{20}H_{17}NO_4HCl + 2H_2O$. The chloroplatinate, iodhydride and nitrate, however, are well adapted for analytical examination, and the results which they afford agree closely with those required on the assumption that berberine is $C_{20}H_{17}NO_4$. When oxidized with an excess of potassium permanganate in slightly alkaline solution, berberine yields, as principal product, hemipinic acid, $C_{10}H_{10}O_6$, as Schmidt and Schilbach (*Arch. Pharm.*, [3], 164–170) have already shown. In view of the interesting results lately obtained by Goldschmiedt in his examination of hemipinic and methemipinic acids, the author has carefully re-examined the hemipinic acid from berberine, and is convinced that it is identical with that obtained by the oxidation of narcotine. The acid from berberine contains two (OCH_3) groups; on fusion with potash it yields protocatechuic acid, and on distilling it with ethylamine, hemipinethylimide, melting at 96°, is formed. This latter substance possesses all the properties of the hemipinethylimide obtained by Liebermann by the action of ethyl iodide on the potassium salt of hemipinimide (from narcotine), and thus the identity of the two hemipinic acids from berberine and narcotine is proved. Besides hemipinic acid, small quantities of at least two other acids are formed by the oxidation of berberine; one of these melts at 238-242°, and appears to be identical with berberonic acid (or carbocinchomeronic acid?). If berberine is carefully oxidized with a limited quantity of permanganate, a number of new substances are formed, three of which have already been obtained in a state of purity; a new acid, $C_{20}H_{17}NO_9$, which melts at 143°, and two neutral substances, $C_{20}H_{17}NO_8$ and $C_{20}H_{16}NO_7$, all of which yield protocatechuic acid (berberinic acid?) on fusion with potash. The compound $C_{20}H_{17}NO_8$ melts at 236°; it is insoluble in cold solutions of alkaline carbonates, but dissolves in potash, ammonia, etc., forming well-defined salts. The silver salt appears to have the formula $C_{20}H_{15}NO_8Ag_2 + 4H_2O$. The compound $C_{20}H_{15}NO_7$ (?) melts at 150°, and is insoluble in alkalis. When heated with a fuming aqueous solution of hydrogen iodide, berberine yields methyl iodide and a phenolic substance, which from the analysis of its sulphate appears to have the formula $C_{18}H_{13}NO_4$, being derived from berberine by the displacement of two methyl-groups. Several determinations of the number of (OCH_3) groups by Zeisel's method have shown that there are two such groups present in the berberine molecule. The author has also examined berberine acid—one of the acids obtained by Hlasiwetz and Gilm (*Jahresbericht*, 1864, 407), by fusing berberine with potash. This acid is decomposed on distillation into carbon dioxide and homopyrocatechol—a decomposition which proves that the acid must be looked upon as a carboxylic acid of this phenol. The behaviour of berberine towards methyl and ethyl iodides, benzylchloride, etc., has also been studied; it appears in opposition to the results of Henry (*Annalen*, cxv., 133), that the alkaloid does not form additive compounds with these substances.

The Action of Ammonia on some Tungsten Compounds. By Dr. S. RIDEAL, D.Sc.

Condensations of α-Diketones with Ethylic Acetoacetate. By FRANCIS R. JAPP, F.R.S., and FELIX KLINGEMANN, Ph.D.

Thionyl Thiocyanite. By G. C. MCMURTRY.

Mercuric Chlorothiocyanate. By G. C. MCMURTRY.—Mercuric chlorothiocyanate, ClHg·SCN, or $HgCl_2$·Hg $(CSN)_2$, may be obtained by crystallizing mercuric thiocyanate with mercuric chloride. It crystallizes in monosymmetric prisms, sparingly soluble in cold water, but readily soluble in hot water and in alcohol.

The Action of Chromium Oxychloride on Pinene. By G. G. HENDERSON, B.Sc., M.A., and R. W. SMITH.—The authors find that pinene and chromium oxychloride interact very readily, forming a solid compound of the formula $C_{10}H_{16}$·2 CrO_2Cl_2. This is decomposed by water, yielding an oil which may be purified by distillation with steam, and which has a composition expressed by the formula $C_{20}H_{33}OCl$. It is possible that this oil may be a mixture of the two compounds $C_{10}H_{18}O$ and $C_{10}H_{15}Cl$, but the authors were unable to separate it into two portions by steam-distillation; it is not attacked by alcoholic potash, does not combine with bisulphites, is unaffected by acetic chloride, and does not interact with either hydroxylamine or phenylhydrazine. When distilled under diminished pressure it loses the elements of a molecule of water, yielding an oil of the composition corresponding to the formula $C_{20}H_{31}Cl$.

Tectoquinone. By R. ROMANIS, D.Sc., Rangoon College.—In a former communication (*Trans.*, 1887) the author described a substance found in teak resin (*Tectonia grandis*), and also in the products of the destructive distillation of the wood, having the composition $C_{18}H_{16}O_2$, and the properties of a quinone. It may be separated from the tar by caustic soda, which dissolves the tar, leaving a curdy mass containing the quinone, mixed with a hydrocarbon of the composition $CnHn$, melting at 194°, and other substances. The quinone is separated by dissolution in boiling alcohol of 50 per cent., in which the other substances are insoluble; it separates as the liquid cools in a felted mass of soft woolly crystals; from strong alcohol it is deposited in oblique rhombic prisms of an amber colour, resembling sulphur. It melts at 171°, sublimes slowly at ordinary temperatures, sensibly at 100° C., and rapidly near its melting point. By careful heating between watch-glasses it can be sublimed without decomposition, condensing in yellow rhombic plates. It is a very stable substance, dissolving in sulphuric and nitric acids, and being precipitated unchanged on dilution; apparently it is not acted on by fused potash. On heating it with absolute alcohol and potash, a deep crimson solution is formed, which deposits bronze-coloured crystals on cooling; on exposure to moist air or on mixing with water, the crimson solution turns green and yellow, and the quinone is reprecipitated. The quinone is reduced if heated with zinc and acetic or chlorhydric acid in a sealed tube at 150° C. The product is a resin, soluble in alcohol and ether, the dilute ethereal solution showing a splendid blue fluorescence. A similar resinous product is formed by the action of iodine, phosphorus and water, but in this case the principal products are volatile. These resinous products contain from 4·7 to 5 per cent. of oxygen, showing that 40 per cent. of the quinone is unreduced, and in fact it gradually separates from the resin in rhombic crystals. Analysis shows the composition of the reduction product to be $C_{18}H_{22}$ (m. p. 72°?). If the quinone be heated with soda-lime and zinc, it yields a hydrocarbon melting at 194°, which crystallizes from alcohol in four-rayed stars composed of twinned rhombic plates. Dibromotectoquinone is obtained by the action of bromide at 100—140°. It crystallizes in orange-yellow, slender needles, which are generally arranged in spherical clusters, soluble in ether and alcohol. On fusion it melts at 165°; with potash it gives a blue or purple melt; this dissolves in water, forming a purple solution, from which acids throw down a yellow flocculent precipitate, no doubt a dihydroxy-quinone. Dinitrotectoquinone is a yellow powder obtained by the action of nitrosulphuric acid on the quinone. It is converted by sodium-amalgam, or zinc and caustic soda, into a crimson substance. If the quinone be heated for two hours with nitrosulphuric acid, and the solution be then diluted, a purple precipitate is produced, which dissolves in alkalis, forming a purple solution. Tectoquinone may possibly be retenequinone, which has not yet been discovered. Retene melts at 99° C.; the product of the reduction of tectoquinone softens at 70–72°, but it is evidently a mixture.

The Decomposition of Nitroethane by Alkalis. By WYNDHAM R. DUNSTAN and T. S. DYMOND.—The authors have been engaged during the present year in studying the action of alkalis and of certain reducing agents on nitroethane. They observed in October, 1887, that nitroethane is gradually decomposed at ordinary temperature by contact with potassium carbonate or its aqueous solution; at 80–90° the action is completed in a few hours. The chief products of the change are potassium nitrite and an oily liquid having the formula C_6H_9NO, which boils at about 170°, decomposing at a somewhat higher temperature with the formation of what appears to be a pyridine derivative. The compound is not attacked when heated for forty-eight hours in a closed tube with concentrated chlorhydric acid, neither is it appreciably affected by reducing agents. It is readily oxidized by permanganate. It does not seem to be either a nitroso or isonitroso-derivative. This compound is apparently identical with that described by Götting (*Annalen*, ccxliii, 104), who obtained it in Geuther's laboratory by heating together propyl iodide, sodium nitroethane and sodium ethoxide. Its ready formation, together with potassium nitrate, from nitroethane by contact with potassium carbonate, is likely to have an important bearing on the question as to the constitution of the paraffinioid nitro-compounds, and the authors therefore intend to continue the investigation. They are induced to publish the present preliminary notice by the appearance, in a recent number of the *Berichte* (November, 1888, p. 710), of an abstract of a paper by Sokolow in the *Russian Chemical Journal*. It is there shown that by heating nitroethane to 100–130° in closed tubes with sodium hydroxide or carbonate, the compound C_6H_9NO, described by Götting, is produced, and that if an alkyl iodide is present it takes no part in the change. Neither sodium hydroxide nor sodium carbonate attacks nitroethane at ordinary temperatures.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, December 6, Mr. W. L. Williams, Vice-President, in the chair.

Mr. C. W. Andrew read a note on "Spirit of Sal Volatile and Methods for its Estimation," which included an introductory portion, chiefly historical, and a record of experiments made to compare the various methods of estimating the amount of ammonium carbonate present. The author's object was to ascertain which of the methods ordinarily employed gave the best results, and was most easily performed, and therefore most suitable for ordinary employment in pharmacy.

A quantity of spiritus ammoniæ aromaticus was made according to the British Pharmacopœia, and several estimations performed by each method tried.

1. The official method was found to give very good results as to accuracy, and to indicate easily whether the specimen was up to, or below, the required strength, but to be very tedious in operation if it was desired to estimate an unknown amount of carbonate, on account of the necessity for constantly filtering small portions

to ascertain if further precipitation occurred with more of the reagent.

2. Precipitating the carbonate with $BaCl_2$, drying and weighing, was found to require considerable time and care; the results agreed with those by the first method.

3. The carbonate was precipitated by excess of $BaCl_2$, and the filtrate and washings titrated for free NH_3 by standard oxalic acid solution, or (to avoid precipitation of Ba salt) by standard hydrochloric or nitric acid solution; the amount found was deducted from the total NH_3 present (found by a previous experiment) and the difference reckoned as carbonate $(NH_4)_2CO_3$. This method gave very bad results, as the barium carbonate precipitated very slowly, and if filtered at once too much alkali was found in the filtrate, which if allowed to stand half an hour in a closed flask before filtering, the amount in the filtrate was somewhat too low.

4. The method proposed by Mr. Gravill (*Pharm. Journ.*, [3] xvii., 445), which consists in measuring the CO_2 evolved on addition of an acid, the operation being conducted in a nitrometer over mercury. This was found very easy and expeditious, but the results obtained by the author were slightly below those obtained by the other processes when using the correction given by Mr. Gravill for the solubility of CO_2 in the liquid.

In summing up his results, the author recommended the last method for pharmaceutical purposes, on account of its quickness, convenience, and simplicity, as well as approximate accuracy.

The paper was followed by a discussion, in which the Chairman, Messrs. Dymond, Browne, Stark, Wyatt, Ough, and the Secretary took part.

Mr. W. A. Sâlter then gave a report on materia medica, consisting of notes on drugs of the Unofficial Formulary. The principal substances referred to were bryonia, erythrophlœum, euphorbia pilulifera, euonymus atro-purpureus, hydrastis canadensis, grindelia, and cascara sagrada. With regard to the latter, the author referred more particularly to the "tasteless" extract prepared by means of magnesia, and the question whether or not the activity was destroyed as well as the bitterness. Contrary to the experience of Dr. Symes, the author found considerable quantities of magnesium salt in the "tasteless" extract.

A discussion followed in which the Chairman, Secretary, Messrs. Dymond, Browne, Burridge, Ough and Hawkins took part.

Mr. Hawkins showed a set of specimens illustrating the influence of light on the sublimation of volatile bodies such as menthol, camphor, chloral hydrate, iodine, etc., which showed fine crystals on those portions of the bottles which had been exposed to light, but strictly confined to those parts, after which the meeting adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

(*Concluded from page* 442).

The next communication read was a—

Note on the Hypodermic Administration of Cocaine for Tooth Extraction.

BY W. RUSHTON,

Pharmaceutical Chemist.

As I daresay you may sometimes be asked by your medical and dental friends how the drug is administered for tooth extraction I think the following note may supply you with the desired information.

As a rule the dose is half a grain, and it is a very good plan to supply it in ½ grain powders, so that the administrator may have it handy for use. These powders should be wrapped in waxed paper or preserved in a bottle.

One powder should be dissolved in 5 minims of water, making, of course, a 10 per cent. solution. See that the needle is clean, and inject half the solution on each side.

The needle may be entered anywhere in the mucous membrane (just opposite the apex of the fang is preferable), but it must not be passed down to the root, as the periosteum of the tooth is so tough and fibrous, that it does not at all readily pass into the surrounding tissue.

It should be injected very slowly, watching the patient all the while, and if there is any signs of pallor, faintness, or complaints of nausea the administration should be stopped. The injection should take from ten to twenty minutes, according as the patient is affected by the drug.

The slow injection is the most important point in the administration. The sensibility of the gum to pain may be tested by pricking it with a sharp instrument, or passing one down the fang of the tooth. Inflammation of the gum contraindicates its use, as you cannot be always certain of destroying all sensibility, though frequently it does, if well injected.

The President asked Mr. Rushton if he considered cocaine any use for ordinary toothache.

Mr. Wybrant remarked that cocaine had been found in some cases to produce most unpleasant and even dangerous results, but in his own case he had found it very useful.

Mr. Richards asked if 10 per cent. was not too strong a solution for tender gums.

Mr. Rushton, replying, said that in cases of toothache arising from sensitive dentine cocaine was useless, but in cases of pressure of the nerve it generally gave relief temporarily. There had been cases of bad effects from the use of cocaine in dental practice, but he believed them to be due to idiosyncracy of the patient or unskilful injection. The great point to be observed was the slow injection. A 10 per cent. solution was not too strong, if not more was used than would represent ½ a grain of the salt.

The last paper read was—

Note on Easton's Syrup.

BY PETER MACEWAN, F.C.S.

Just a year ago Mr. Fraser McDiarmid, in his notes on "The Unofficial Formulary," contributed to this Association, said regarding the B.P.C. formula for this preparation, and inferentially regarding the preparation itself:—

"This is weaker in quinine than the original formula for Easton's syrup; it remains almost colourless, but after a month's keeping in a cool place (say 50° and under) there is a separation of crystals of quinine phosphate; after two months it is almost solid."

A correspondent of the *Chemist and Druggist* recently asking the editor's advice regarding the formulary syrup, remarked of it:—"There is a white precipitate thrown down within twelve hours after making. I have made it with different samples of ingredients, but get the same result." And he submitted a part of the deposit which had rendered the syrup quite thick. I have heard several complaints of the same kind from different pharmacists, and not very long ago in speaking to an active member of the Formulary Committee on the subject, he threw out the suggestion that the precipitate is probably due to the use of quinine made from cuprea bark, which contains homoquinine. The inference is that the deposit is not quinine, but homoquinine phosphate. Another member of the Formulary Committee informs me that he had trouble with the syrup until he began to use quinine hydrate in making it; since then the precipitate has been but trivial, not more in fact than one

could expect of any compound preparation of this nature. The B.P.C. formula is taken from the 'Extra Pharmacopœia,' but Mr. Martindale's formula originally gave 1 grain of quinine phosphate in each fluid drachm, instead of ¾ grain, as at present. It would seem from the foregoing that the quinine is the disturbing element in the syrup.

I have not had an opportunity of making the Formulary syrup, and much of my experience of the preparation is based on the formula given in the earliest editions of Squire's 'Companion,' which was, if I mistake not, a reprint of the original. This formula was substantially for a solution of phosphates of iron and strychnine and sulphate of quinine in a phosphoric acid syrup.* The sulphate of quinine was ordered in the proportion of 1 grain to the drachm, that is, slightly more than the equivalent of 1 grain of phosphate of quinine ($2C_{20}H_{24}N_2O_2$, H_3PO_4, $8H_2O$). This syrup kept wonderfully well, was easily made, never gave any precipitation trouble, but it was apt to become somewhat highly coloured in the course of a few months. This, however, was no objection in a large business where the syrup was frequently made. Still, I cannot defend the formula from the pharmaceutical purist's point of view, which demanded the precipitation of the quinine as hydrate, and the re-solution of that in the phosphoric acid. In order to get rid of the sulphate radicle in this improved method, it was necessary to wash well, and the washing, according to Mr. William Gilmour, was attended with a loss of 10 per cent. of the quinine, the quinine phosphate strength of the finished syrup being 0·96 grain per fluid drachm, or, as Mr. R. H. Davies and Dr. Schmidt put it, ·814 grain of $3C_{20}H_{24}N_2O_2\ 2H_3PO_4$, which they consider to be the phosphate existing in the syrup. Instead of washing the precipitate, it is a better plan to agitate the alkaline fluid with several portions of chloroform, afterwards dissolving out the alkaloid from the chloroform with phosphoric acid and water. In this way there is no loss of quinine by washing, and the little chloroform which dissolves in the acid fluid is easily got rid of by heating. Although the method of preparation is "improved" in the modified formula, the syrup itself is not, and on the whole I consider the B.P.C. formula to be the best which we have, so far as convenience of manufacture is concerned; as Mr. Michael Conroy has said, "It is simplicity itself."

But the objection made by Mr. McDiarmid and others remains. That is a point which needs looking into, and as the Formulary Committee must have its hands pretty full in devising new things, the members of this Association could render assistance in the improvement of the old by examining any samples of syrup which have "gone wrong." I very much doubt the statements that the precipitate is quinine. Quinine salts once in acid solution are not so tender things as to change their character and become insoluble by mere exposure to atmospheric influence. Coming down to actual experience, I find that on examining the precipitate from the sample already referred to, that it is not quinine phosphate or any other alkaloidal salt, but ferric phosphate, giving Fe_2O_3 equivalent to 92 per cent. of anhydrous ferric phosphate. The organic matter adhering to it scarcely gives opalescence with Mayer's solution. This result corroborates, somewhat curiously, the conclusion arrived at about four years ago when I examined a precipitate from Easton's syrup, and reported the result to the Edinburgh Chemists' Assistants and Apprentices' Association. In that case, too, the precipitate was ferric phosphate. It is natural in these circumstances that I should have some doubt as to the precipitation of quinine in Easton's syrup, and I feel justified in inviting proof of the assertion.

* Sulphate of iron . . . . . 5 drachms.
Phosphate of soda . . . . . 1 ounce.
Sulphate of quinine . . . . . 192 grains.
Strychnine . . . . . 6 grains.
Dilute phosphoric acid. . . . . 14 fl. ozs.
Sugar . . . . . 14 ounces.
Make 24 ozs. of syrup without heat.

The President remarked that the old syrup deposited considerably, and was not a satisfactory preparation. Mr. MacEwan's statement as to the nature of the deposit was very interesting, and afforded valuable suggestions for a modification of the formula.

Mr. Robins was accustomed frequently to make Easton's syrup. He had always made it by the old formula, which he had found to yield good results and to deposit but very slightly.

Mr. Lewis Ough had frequently made this preparation according to the formula given in the 'Extra Pharmacopœia.' The phosphate of iron was not always quite soluble, but he had not found any thrown out.

Mr. Bird said that in his experience quinine phosphate was undoubtedly the best form in which to use quinine in making Easton's syrup. A very good plan was to keep the iron separately in solution and add it to the other ingredients (in solution) when required.

Mr. Stark had always found the old formula to yield excellent result. He had never found it deposit at all, although he had made considerable quantities of it. The one objection to it was its change in colour, a change due, he believed, to the charring of the sugar by the acid.

In the absence of Mr. MacEwan, who was unable to attend the meeting, there was no reply to the observations made.

The President then exhibited some crystals of calomel made by Messrs. Howards and Son, Stratford. These crystals were large, well defined and brilliant, but extremely brittle. They were obtained, he was informed, by carefully breaking up the mass after sublimation, the crystals separating very easily from one another. It was necessary that the sublimation should be slowly carried on in a moderate-sized vessel. He had examined them, and found them absolutely pure. If powdered by rubbing in a mortar a yellowish tint was developed, but no trace of mercuric salt could be detected. It had been stated, by American authority, that the powdered crystals were milder in their physiological action than the products obtained by air or steam, or than that obtained by precipitation.

The proceedings then terminated.

A meeting of this Association was held at 103, Great Russell Street, on Thursday, November 29, Mr. E. J. Millard, President, in the chair.

The minutes of the previous meeting having been read and confirmed, the President called on Mr. F. V. Butterfield to read his paper on—

Photography.

BY F. V. BUTTERFIELD.

The subject I propose bringing before your attention this evening, though altogether outside the region of pure pharmacy, is nevertheless one of considerable interest and some importance to pharmacists generally, and since the introduction of the gelatine dry plate has moreover become a most attractive and pleasurable pursuit.

With the exception, therefore, of a short and succinct historical account, and a few necessary remarks on its relation to light and chemistry, I shall devote the best portion of this paper to the more important details and *modus operandi* of that branch popularly known as "amateur photography," so that any who are desirous of taking up this fascinating pursuit may be able to do so with, I hope, facility and ease. At the same time, however, others who cannot, for various reasons, take up the practice of photography for pleasure, or who rather choose to "scorn delights

and live laborious days," will find, I am quite sure, a slight acquaintance with this subject either useful from a business, or interesting from a scientific point of view, for, disregarded as a work of art, but looking at it solely from a scientific standpoint, a photograph may be considered simply as the result of a series of very delicate chemical reactions.

Boasting of barely half a century's existence, photography has made such rapid and gigantic strides that the position it holds to-day is one of the highest importance. Reverting to the details of its discovery we first of all find the old alchemists in the sixteenth century, whilst engaged in their mysterious craft, puzzling over the change they observed took place when silver chloride, or as they termed it, luna cornua, was exposed to the light, and which, they eventually decided, must be due to a kind of transmutation of metals, a conclusion drawn very possibly, I think, from the philosopher's stone point of view, which when discovered would in some such simple manner "transmute" all the baser metals into gold.

The matter remains in *statu quo*, until another century "has dragged its slow length along," when history records that this phenomenon attracted the attention of one—Robert Boyle—the most learned philosopher of his time, and which he finally settled to his own satisfaction must perforce be caused by the action of the air, "sed de mortuis nil nisi bonum." He lived in dark days, when chemistry as a connected science could hardly be said to exist.

The question once more lapses for a long period into a state of quiescence, until at length Scheele, whose name is well known to all of you, appears upon the scene, deeply interested in and trying to solve this very problem, but although he succeeded in proving, by various means, that it was really owing to a reduction of the silver chloride, with partial loss of chlorine, his researches proved of little practical utility at the time.

Years roll on, iodine and bromine have both been discovered, and found to give salts of silver much more sensitive to the light than the old chloride; in fact, on all hands we find the enthusiastic army of workers in this scientific research ever increasing and bringing matters gradually to a climax, which at last took place in 1839, a year ever memorable in the annals of photography, as the period that marks its birth, and when Daguerre, a poor French painter, first exhibited to the gaze of an astonished world the great discovery which now bears his name, the daguerreotype, its appearance being warmly welcomed by the vast majority who saw at last a long felt want supplied, the very small minority consisting of those who gained a pittance by the art of miniature portrait painting, and to whom it was painfully apparent that their occupation had fled. The French government then granted the father of photography and his clever partner, Isidore Niépee, a pension, chiefly on the ground that "The invention did not admit of being secured by patent, since, as soon as published all might avail themselves of its advantages; they therefore preferred to enjoy the glory of endowing the world of science and art with one of the most surprising discoveries that honour their native land."

In England, Wedgwood bearing in mind the experiments of Scheele with silver chloride, and assisted by Sir Humphry Davy, had been busily employed in conducting experiments at the Royal Institution with this substance; but, although he had actually succeeded in obtaining images, no method could, by any possible means, be discovered of "fixing" or making them permanent, so that, when exposed to the light, his pictures gradually faded from view.

Now, there is here real reason for regret, because a year or two later, before the discovery of the daguerreotype had taken place, Sir John Herschel first prepared and demonstrated the properties of hyposulphite, or more properly speaking, thiosulphate of sodium, particularly calling attention to the remarkable solubility of silver chloride in its solution. Here, then, was the very thing for which Davy had longed in vain, and it is now generally supposed that Herschel was ignorant of the results obtained and published a few years previously by Wedgwood and his illustrous assistant Davy. Another circumstance, perhaps still more remarkable, is, that even Daguerre, when he made his great discovery known, was not in possession of any perfect method of fixing his pictures, and it thus remained for Herschel to once more call attention to his discovery as the only means by which photographs on silver salts could be permanently "fixed."

Herschel, also, first suggested the use of glass plates, and his cyanotype is, even now, largely used by draughtsmen and others for taking copies of drawings, tracings, etc. In this process one side of a sheet of white paper is brushed over (in the dark or some non-actinic medium), with a solution made by dissolving 1 ounce each of potassium ferricyanide and ferric ammonium citrate in 8 ounces of water. When dry it is ready for use, and may then be exposed to a good light, beneath the subject to be copied, and afterwards "developed" by simply washing in plain water. During the process of printing the ferric salt is reduced to ferrous by the action of the light (in the presence of organic matter), and this at once combines with the ferricyanide present, to form ferrous ferricyanide or Turnbull's blue, which, being insoluble, is not affected by the subsequent washing in water, whilst the unchanged ferric salt is easily washed out, and thus an exact facsimile of the subject, be it negative, drawing or tracing, remains.

In 1841 Fox Talbot patented his famous calotype process. By it he obtained invisible images on paper, made sensitive with silver iodide, and developed them by means of a solution of gallic acid. Paper negatives, which at the present time, by reason of their light weight, compactness, etc., are promising to supersede those of glass, are thus by no means "new," another proof that there is nothing new under the sun. There is this difference, however, that the image was in the *texture* of the paper in Talbot's negatives, whilst now it is on the surface, so to speak.

But if photography was not originally given out to the world as the invention of one of perfidious Albion's sons—although at the same time, be it remarked, historians generally concede to Wedgwood the honour of having been the *first* photographer—we can console ourselves with the fact that, to a worker on this side of the silver streak, Scott Archer to wit, belongs the honour of having introduced the collodion process, as it exists to-day, and in importance his discovery certainly ranks next to that of the daguerreotype. As he had not taken out a patent for his process, and the best thanks of photographers are due to him for this, our Government granted at his premature death a pension to his bereaved family, because he had been "the discoverer of a scientific process of great value to the nation, and from which the discoverer had reaped little or no benefit."

His collodion process then came extensively into use, as the results obtained by it, for studio work in general and portraiture in particular, were vastly superior to those of the daguerreotype. The substitution of glass for metal as a substratum was also a step in the right direction.

But even here photographers did not by any manner of means rest contented, for we find that a grand improvement was soon to take place in the introduction of gelatine as a substitute for the use of collodion, first proposed, after satisfying himself with experiment, by Dr. Maddox, and made practically and commercially successful by Mr. Kennet, of, strange to say, Maddox Street.

Thus, speaking generally, we have at present three

chief photographic processes, the daguerreotype, the collodion, and the one just mentioned, or the gelatine-bromide process.

The daguerreotype is still occasionally preferred for some special kinds of work, and the collodion process has its advantages, particularly in the production of "positives," but the introduction of the rapid gelatine dry plate, devoid of all the "messiness" of the old wet process, may fairly be said to have called our worthy friend, the amateur photographer, into existence, and made him a striking feature of the nineteenth century.

The daguerreotype consists of a copper plate, which is first coated on one side with a very thin layer of metallic silver by electro deposition and then submitted to the combined action of bromine and iodine, thus forming silver bromo-iodide, a combination which has been proved by experiment to be much more sensitive to light than either of the separate single salts.

After exposure in the camera, the photographic image is developed by means of metallic mercury vapour, usually performed by heating a layer of mercury to about 150° Fahr., and suspending the plate over it, in the dark, or some non-actinic medium, of course, then finally fixed by a solution of thiosulphate of sodium.

Now, as regards the chemistry of this process, the first question that naturally presents itself is, What important change does the light produce on the sensitive surface of silver haloid salts when exposed to its influence? You will at once remember that this is the very problem Scheele tried so hard to solve, and to-day, although a century after, we have not yet arrived at a clear solution. This is possibly little matter for surprise when we consider that, to begin with, we do not know what light itself really is. Some theorists even argue that the light does not produce any chemical decomposition whatever, but merely a physical change. The accepted theory, however, appears to be, and it receives the support of our best authority—Captain Abney—that a subsalt is formed thus—

$$Ag_2I_2 + \text{light} = Ag_2I + I,$$

the free iodine combining with excess of silver present to form more silver iodide.

But then, on the other hand, no one has ever yet prepared a definite chemical compound of silver with any of the halogens, containing *less* of the latter than the ordinary chloride bromide or iodide, and so the matter remains.

Accepting the subsalt theory, then, the development of the latent or photographic image is apparently due to the attraction of the sub-iodide for the mercury-vapour, the resulting visible image consisting of a white amalgam of mercury and silver, whilst in the process of "fixing" the thiosulphate simply dissolves away the unaltered iodide by forming a soluble double salt thus,

$$2AgI + 3Na_2S_2O_3 = Ag_2Na_4(S_2O_3)_3 + 2NaI.$$

Turning to the collodion process, we find *glass* plates are used, coated on one side with collodion, containing in its solution a bromide and iodide, usually ammonium iodide and cadmium bromide, and as soon as it is "set," they are sensitized by immersion in a bath of silver nitrate, when double decomposition of course takes place in the film, silver bromide and iodide being formed. Whilst still in this moist state, they are exposed in the camera, and after exposure, a solution of ferrous sulphate, with the addition of a little acetic acid and alcohol, is used for their development. The reactions that take place whilst developing, being oxidization of the ferrous salt to the ferric, and consequent reduction of the silver salts to the metallic state, the latter remaining insoluble in the film, and constituting the image, the acid contained in the developing solution merely acting as a restrainer to prevent the too rapid reduction of the silver salt, whilst the alcohol simply exercises a mechanical action in causing the solution to flow more evenly over the plate.

The reaction would, I think, be expressed by the following equation:—

$$6Ag_2Br + 6FeSO_4 = Fe_2Br_6 + 2(Fe_2 3SO_4) + 12Ag.$$

After washing they are then "fixed" by means of a solution of "hypo," which, as before, merely dissolves out the unaltered iodide and bromide of silver.

The result of all this work is a negative, from which as many copies as required may be taken by the process of printing. The conventional term "negative" may possibly puzzle some, so I will just explain *en passant* that it is so called in contradistinction to a "positive," which is a picture in itself, whilst a "negative" is only the means of making one; in the latter all the lights and shades are reversed; it is always examined by transmitted light, the former by reflected light.

As stated in a previous portion of this paper, wet-plate photography seems well adapted for taking "positives," and the peripatetic photographer, a well-known character in all popular places of resort, does not by any means lose sight of this. Another common form of the collodion positive is the ferrotype, possibly familiar to you, under the name of "American Gem" portraits, the only difference being in the substitution of a thin sheet of enamelled iron for the ordinary glass plate.

The gelatine-bromide process is similar in principle to the above, but here gelatine is used in the place of collodion for holding the sensitive silver salts *in situ*, the advantages being that the plates can be prepared a great length of time before using and also after exposure; they may be kept for a lengthened period, prior to development, a fact of no little importance, when on a tour abroad, for instance; but the most striking feature in connection with its use is that the gelatine in some way or other appears to act splendidly as a most energetic sensitiser, so that the part it plays may not be entirely mechanical, and thus the slowest gelatine dry plate on the market is twenty times more rapid than the old wet plate, whilst those devoted to instantaneous work are about sixty times more sensitive.

The preparation of these plates requires special apparatus, and as they can now be bought so very cheaply, it would not repay an amateur to make them, so, having obtained a supply, the next step is to draw on them a picture by the aid of light, or in other words, to take a photograph.

Now a ray of ordinary light can be split up by dispersion into a series of different colours, commencing with red and ending in violet, the latter being the most refrangible, the former least so, and the spectrum so obtained also possesses three different properties, calorific, illuminating and chemical. The heating effects reside chiefly in the red rays, illuminating in the yellow, whilst the violet and some still more refrangible or ultra-violet rays constitute the chemical or actinic properties, and it has been proved that the decomposition of silver salts by light is almost entirely due to these actinic rays. Thus we are enabled to do all our work, such as preparation of the plates, development, etc., with impunity in a deep ruby light, which has no palpable effect on the most rapid gelatine. But it will now also be apparent to you that it is no easy matter to take a good photograph of, say, a fair sitter, possessing lovely blue eyes and red hair, or an individual furnished with a liberal supply of yellow freckles, or say, a painting where all the varied colours of the spectrum are blended together in one harmonious whole; but for work of this sort special plates are prepared called "orthochromatic," in which the sensitive film is stained with some aniline dye; an ammoniacal solution of eosin or tetrabromfluorescein has been found to answer extremely well, and plates prepared with it are the subject of a patent.

Any object which reflects yellow or red, will appear

almost black when reproduced by photography, whilst any shade of blue is almost equivalent to white. These facts must be borne in mind when calculating the time requisite in exposure.

The lenses employed must, of course, be rendered achromatic. This is easily effected by a proper combination of flint and crown glass, but, as they cannot be entirely freed from spherical aberration, we are obliged to use diaphragms to cut off the outer rays, in order to obtain pictures sharp and crisp all over.

Cameras are made in a variety of shapes and sizes. With regard to the latter I recommend the half-plate size, as it is not too cumbersome to become a nuisance when touring, and enlargements can easily be made on the "bromide" paper sold for the purpose, if required. The shape should be square, having a reversing frame, swing back and rising front. The first is very useful, from the fact that we can take a photograph, with the plate held in either a horizontal or vertical position, instead of having to alter the position of the camera as of yore. The swing back is brought into play, whenever it is necessary to tilt the camera, serving to keep the plate as nearly as possible in a perpendicular plane, whilst the rising front will sometimes obviate tilting the camera, etc. The bellows should be extensible to twice the focus of the lens, so that the camera may be also used for copying other photographs, etc.

Three double backs are usually provided with each camera. These are light-tight, and the first operation is, to fill them with the dry plates. This, as I explained, must only be done in a non-actinic medium. If a proper dark room cannot be fitted up, the darkest place possible should be secured, and all work, such as development, etc., always reserved till night, when by the aid of the ruby lamp there is no difficulty whatever. The packet of quarter plates is then opened in this red light, and carriers are provided to enable the half plate dark slide to be used for any smaller plate; so the quarter plate having been placed in the rabbet of the "carrier," film side down, and secured, the camera is next mounted on its tripod stand.

Portraits require some experience in "lighting," posing, etc., before they can be taken at all satisfactorily; it is better to commence, therefore, with some simple object, such as a building. Having taken up some coign of vantage uncap the lens, and with the cloth drawn over your head to keep out extraneous light, proceed to focus. Owing to the rectilinear propagation of light the image of the object of course appears upon the screen in an inverted position. In a portrait it is usual to focus the eyes of the sitter only, but for a landscape generally the foreground, in order to get the effect of distance, whilst the arrangement of the picture itself will call into requisition your artistic tastes and abilities.

Having thus got the object into as sharp focus as possible, by means of the rack and pinion adjustment, recap the lens, withdraw the screen, and in its place insert the dark slide containing the gelatine dry plate. Now comes the most important operation, that is, *exposure*. No hard and fast rule can be given for this, it is gained only by experience and practice: with an ordinary dry plate, doublet lens, and nicely diffused light, two to three seconds may be considered the average time to give, but on this occasion only draw out the shutter of the dark slide to one-third its length and give one second; then draw it out another third, being careful not to disturb the position of the camera, and give another second; finally, expose for one second more when drawn out to its full extent.

There will thus be, on that one plate, the results of three exposures of one, two and three seconds each.

The next step is the *development* of the photograph. For this purpose many different solutions have been suggested and used from time to time, but the one I always use recommends itself for simplicity, and has the great advantage of working well with almost any maker's plate. One has, moreover, considerable control over it during development, its action being easily modulated to suit either "under" or "over"-exposed plates.

℞ Am. bromid.	℥ss.
Liq. am. fort., ·880	℥j.
Aq. ad.	℥x.

Misce.

For a quarter plate take 1 ounce of the above, and immediately before using, add to it 2 grains pyrogallol; for a half plate use, of course, just double the amount.

The reason for adding the "pyro" at the last moment will be obvious, being simply because its alkaline solution so rapidly absorbs oxygen from the air, that it is soon rendered useless as a "developer." Sulphites have been used to prevent this, but it is really very little trouble to add the pinch of "pyro" at the last moment.

Developing solutions containing pyrogallol have a nasty habit of staining everything, linen, hands, etc., with which they come in contact, said to be due to the formation of metagallic acid, and recently Capt. Abney has suggested the substitution of hydroquinone for it. These bodies are closely related chemically, the former being, of course, trihydroxybenzene $C_6H_3(OH)_3$ and the latter dihydroxybenzene $C_6H_4(OH)_2$. In the reaction during development the latter is simply oxidized to quinone, which crystallizes in light yellow crystals, and is thus devoid of this evil habit of discolouring everything.

$$C_6H_4(OH)_2 + O = \underset{\text{Quinone.}}{C_6H_4O_2} + H_2O,$$

but it does not appear to answer the purpose quite so well as the former.

Hydroxylamine hydrochlorate $NH_2OH.HCl$ has also been pressed into the service of photography, in this capacity, but during the process of development, nitrous oxide gas N_2O is liberated, causing little cracks in the film, and the potassium, or sodium hydrate, which must necessarily be used with it, has a softening action on the gelatine. Its mode of action is perhaps expressed by the following equation:—

$$4Ag_2Br + 2NH_2OH.HCl + 6NaHO = 8Ag + 4NaBr + 2NaCl + 7H_2O + N_2O.$$

Another developer, very largely used, is one with ferrous oxalate, made by adding large excess of neutral potassium oxalate to ferrous sulphate,

$$K_2C_2O_4 + FeSO_4 = FeC_2O_4 + K_2SO_4.$$

In the process of development the ferrous salt is raised to ferric at the expense of the silver salt, which is reduced to the metallic state, forming the image, thus—

$$6\,Ag_2Br + 6FeC_2O_4 = 12\,Ag + Fe_2Br_6 + 2Fe_2(C_2O_4)_3.$$

And so we might go on enumerating the different developing solutions, each having its own supporters, who laud the virtues of their own particular "developer" sky high; but, as I said before, let the amateur stick to the alkaline pyro-developer, and first, thoroughly master the action of that. He can then afterwards try the others, and decide the matter to his own satisfaction. In this developer the ammonia acts as an accelerator, the bromide as a restrainer, whilst the pyrogallol is the reducing agent; therefore, if we have reason to believe, prior to development, that the plate was slightly *over* exposed, we must add a little more bromide to the developing solution, or if *under* exposed, a drop or two of the strong liquid ammonia ·880.

It will appear from the above equations that the chief action of the developing solution is to rob the silver salt of its halogen, and thus reduce it to the metallic state, it having first of all undergone some change by the action of the light, whereby its affinity for the halogen is in some way or other impaired, and rendering it thus more easily reduced. This reduction must take place in a very gradual manner indeed, or the result-

ing negative would otherwise be very harsh and utterly devoid of that beautiful gradation and softness so necessary for the production of a good print; hence the use of a bromide in the developer, although *how* it acts as a restrainer is not exactly known, but it appears in some way or other to assist the silver bromide in resisting the action of the developer.

Some pyro developer having been made, as soon as night sets in again light the ruby lamp, and take the plate on which the three exposures were made out of the dark slide. On looking at it no apparent change has taken place; it appears precisely the same as when first put in; but if the instructions given have been strictly followed a faithful representation of the subject lies latent on the correctly-exposed part, and the next step is to make it visible. Placing the plate in a small dish or tray, film side up, pour on the developer evenly, gently rocking the dish to and fro during the whole time. Now, supposing two seconds to have been the *correct* exposure, then the portion of the plate which received *three* seconds will rapidly flash out, whilst the two seconds part gradually unfolds itself, first the high lights, as sky, white objects, etc., and then the detail in the more shaded parts, whereas on the portion exposed for one second only it will be some time before any change at all is perceptible, then, very slowly indeed, the high lights will become visible, but there will be no detail whatever.

In practice, therefore, as soon as the plate has been flooded with the developer, it is a very easy matter to tell whether the exposure has been correct or otherwise.

As soon as it is thought that all the detail is well out the plate must be rinsed in a little clean water, and put into the fixing bath, which is another dish containing a solution of sodium thiosulphate.

℞ Sod. thiosulph. . . . . ℥iv.
Aq. ad. . . . . Oj.
Misce.

Immediately the creamy appearance (due to the unaltered silver bromide) observed at the back of the plate has entirely disappeared this operation is complete, and it only remains to thoroughly wash the plate in order to remove all traces of "hypo," and place it in a rack to dry. The result is a negative, and from it as many copies as desired may be taken by one of the many different processes of "printing;" for instance, it can be done either in silver, platinum, uranium, iron, or chromium salts, but as the first-mentioned is the oldest and most popular to-day, I shall confine my remarks to that.

(*To be concluded.*)

Obituary.

Notice has been received of the death of the following:—

On the 18th of November, Mr. Francis Hill, Chemist and Druggist, Villiers Street, Sunderland. Aged 87 years.

On the 23rd of November, Mr. John Saxton, Chemist and Druggist, St. Peter's Street, Leeds. Aged 54 years.

On the 26th of November, Mr. Henry John Langham, Chemist and Druggist, Mount Grove Road, Holloway, N. Aged 38 years. Mr. Langham was an Associate in Business of the Pharmaceutical Society.

On the 29th of November, Mr. Thomas Lygo, Chemist and Druggist, Allen Street, Sheffield. Aged 58 years.

On the 30th of November, Mr. Daniel Rotely Harris, Pharmaceutical Chemist, St. James's Street, W. Aged 74 years. Mr. Harris had been a member of the Pharmaceutical Society since 1853.

On the 1st of December, Mr. Edward Holmes, Chemist and Druggist, High Bentham, Yorkshire. Aged 51 years.

On the 4th of December, Mr. James Wood Marder, Chemist and Druggist, Lyme Regis. Aged 64 years.

Review.

THE ART OF DISPENSING: A Treatise on the Methods and Processes involved in Compounding Medical Prescriptions.*

By the publication of this compendium, English pharmacy may be said to be enriched in a hitherto unoccupied field, but one nevertheless in which the want of a technical handbook was frequently felt; for while general pharmacy was tolerably well represented on our book shelves, no one seems to have occupied himself with the production of a book on that special branch of the subject known as "dispensing" or extemporaneous pharmacy. Yet of the several sections into which pharmacy may be subdivided, none, perhaps, is of more importance to the every day worker. The practical and reliable character of the information conveyed in the work before us may be inferred from an inspection of the list of eminent names whose contributions largely make up the present volume, and whose opinion on the subjects discussed may be said to be in a measure authoritative, inasmuch as they are undoubtedly the result of a large and varied experience. A careful and detailed perusal of the contents of the volume confirms us in our opinion of its usefulness, especially to apprentices and assistants, as a guide in overcoming the many difficulties met with in the dispensing work of a pharmacy.

The subject matter, commencing with "General Suggestions," is divided into about thirty headings, under fifteen of which are discussed the various forms in which medicines are dispensed, with the peculiar difficulties attending each; the remainder are occupied with such matters as "Weights and Measures," "Prescribers and Dispensers," "Special Drugs and Chemicals," "Incompatibles," "Foreign Prescriptions," "New Remedies," "Homœopathic Dispensing," "Illegible prescriptions," "Examination Prescriptions," etc., etc., by which it will be seen that the ground covered is extensive and well chosen. We cannot pretend to give anything like a *résumé* of these chapters in detail, but commencing with "general suggestions" we have a summary of opinions on the oft-debated question of "giving copies of prescriptions," and without coming to any definite decision on the matter the pros and cons are fairly and usefully stated. The most valuable portion of this chapter, however, is "Ince's dispensing aphorisms," in which are expressed, in the well-known clear and incisive manner of its author, the whole duties of a skilled dispenser, a kind of pharmaceutical ten commandments, worthy to be inscribed in letters of gold, and to occupy a prominent place in every dispensing department. The chapter on "Weights and Measures" is opportune, and in view of the somewhat hazy notions which one often finds in assistants and pupils on this important subject, deserves careful perusal. The authoritative explanation given by Professor Redwood some years since, of the difference between the ʒ and the oz. deserves especially to be borne in mind, and the often disregarded difference between the lb and the lb is also properly pointed out.

We can hardly endorse the opinion given on page 19, under heading "Prescribers and Dispensers," that "aqua menthæ" standing by itself without any affix should be understood to mean peppermint water; the dispenser would certainly be on the right side in

* London: Office of the *Chemist and Druggist*. Sm. 8vo. 280 pp. 3*s.* 6*d.*

translating this as mint water, *i.e.*, aqua menthæ viridis. Neither can we fall in with the suggestion (p. 33) to prepare the aromatic waters by dissolving the essential oil in rectified spirit in the proportion of about 1–5, and adding 1 fl. oz. of this solution to 4 gals. of water, it being well known that such dilute alcoholic solution is prone to acidify and spoil the product. A much better plan, if extemporaneous waters must be used, is to select a fresh sample of oil, and add to it, in a somewhat large bottle, successive portions of hot distilled water, shaking violently between each addition, and taking care to keep the oil in excess of what the water will dissolve, and, when cold, filter. This process, besides more completely fulfilling the conditions under which these waters are made by distillation, introduces nothing foreign into the water. They are found to be really good representatives of the distilled products, keeping without change for a considerable length of time, probably as long as those made by the official process. A protest is rightly enough entered against the preparation of these waters by the aid of magnesium carbonate and like substances. To make aqua camphoræ of B.P. strength will require a larger proportion of spiritus camphoræ than that recommended on p. 34. The use of concentrated infusions is one against which a vigorous protest should be raised. Their convenience is much more imaginary than real, and no concentrated infusion or liquor, however *artfully* (we use the word advisedly) made, can represent fully the freshly-prepared infusion; with the various drugs in a proper state of division and preserved in stoppered bottles, any of the infusions in ordinary use may be made in half an hour (and several of them as well made in probably less), a space of time which we fancy can generally be spared for the preparation of most prescriptions, *i.e.*, of course assuming that the extent of business does not warrant the regular making of the usually-demanded infusion.

The keeping in solution of the various salts effects a considerable saving of time at the dispensing counter; but we scarcely think the strengths suggested on p. 35 are the most convenient. A great number, the majority, in fact, would be more usefully made of the strength of 10 grains in 1 fl. dr., and as the dose ordered of these salts is usually some multiple of 5 grains, little calculation and subsequent risk of error is involved. We do not notice this strength adopted in any single instance here. A proper appreciation of the relation of weight to measure is necessary in properly adjusting the strength of these solutions. It is no uncommon thing to find an assistant or apprentice dissolving 10 ozs. of magnesium sulphate in sufficient water to make Oj., and then labelling the solution ℥j. in ℥ij., forgetting the fact that when he dispenses ℥ij. of this solution he is getting not 60, but 54·7 grains.

The chapter on pills and their excipients is particularly full and explicit, and contains many useful hints, but the recommendation to keep ext. rhei in a state of powder is surely not seriously intended; it is *difficult* to imagine a more unsuitable substance than this to keep in that condition. The ferruginous pill of Blaud, as might be expected, comes in for a full share of discussion, there being apparently still something to be said on this somewhat well-worn subject. After examining the merits of the several different methods discussed, the wise dispenser will fall back upon the B.P.C. formula as the most effective and convenient.

An obvious error occurs on p. 69, where the dispenser is instructed to use 1 drop of "sulphuric acid" (*sic*) to make 4 grains of quinine into a pill, dilute acid being intended. An unusual prescription is found on p. 68 ordering amongst other things "ferri mangan.," if any dispenser knows what this is; read by the light of the previous paragraph it is probable that this is a misprint for potassium permanganate. Embodied in this chapter are also detailed instructions for pearl coating pills, the directions for which are really practical, and will be found to work quite successfully after a little practice. In spite of the recommendation on p. 95 to mix powders with a spatula, on a sheet of white paper, in preference to using the pestle and mortar, we think the dispenser will do wisely to retain for this purpose the services of the latter time-honoured implement; with great care, no doubt, tolerable results might be achieved with the paper and spatula, but the risks of imperfect mixing would be far greater than in the use of the pestle and mortar. The opinion that ointments containing iodoform should be mixed cold is of course based on the well-known volatility of that body by heat, but there would seem to be no objection to the employment of a moderate heat, if the object be to have the iodoform in solution in the basis. Such a process has the authority of the B.P. in the preparation of ung. iodoformi. The dispenser is very properly warned against the practice of dissolving gallic acid in water by the aid of heat when ordered in larger quantity than is permanently soluble. The difficulty of diffusing equally through the liquid the crystals that form on cooling, is much greater than is the case when the acid is simply rubbed to powder, and added in this form. The same remark will apply also to certain other substances under like conditions.

The chapter on emulsions contains much useful matter, but what is the meaning of this sentence (p. 173): "The emulsifying power of 10 *parts* (*sic*) of gum arabic is estimated to be equal to the yolk of a large hen's egg"? We see no mention made of Forbes' process for the emulsification of essential oils, such as turpentine, eucalyptus, etc., as well as for ether, chloroform, and other volatile substances which it is undesirable to expose to trituration in a mortar, a process which is eminently successful with bodies of this nature. It consists in the addition to each fl. oz. of essential oil, etc., contained in a dry bottle, of 20 grains of pulv. acaciæ, diffusing by a slight shake, then adding ½ oz. of water, and briskly agitating for a few seconds, when the emulsion is complete, and can be diluted to any required extent by the further addition of water without any separation of oil, etc., taking place. The injunction on p. 164, that syrups should invariably be added last, is frequently disregarded in subsequent parts of the book, where syrup or sugar is directed to be mixed with the substance to be emulsified. Undeniably the safest course to pursue is to add these agents last. The list of new remedies is tolerably complete, and contains useful hints as to convenient forms for dispensing many of them. The usefulness of the matter contained in the appendix would, we think, have been enhanced by a table of solubilities in alcohol, glycerine and water of the various salts, etc., used in dispensing.

The revising and editing have evidently received careful attention, few errors have crept in, and these for the most part of an unimportant character. A fairly comprehensive index and table of contents add greatly to the comfort and usefulness of the book.

BOOKS RECEIVED.

THE BRITISH PHARMACOPŒIA, 1885. Third Reprint. London: Spottiswoode and Co. 1888. From the Medical Council.

THE CHEMISTS AND DRUGGISTS' DIARY. 1889. London: Office of the *Chemist and Druggist*. From the Publishers.

REVIEW OF THE PLANTING AND AGRICULTURAL INDUSTRIES OF CEYLON. By J. FERGUSON. Colombo: J. and A. Ferguson; London: J. Haddon and Co. 1888. From the Author.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Compulsory Poison Regulations.

Sir,—I have followed attentively the recent correspondence with regard to poison regulations, and must confess to being a little surprised at the comparatively limited interest excited by a subject of such importance.

If I understand rightly, there is a desire on the part of some that compulsory regulations as to the keeping and storage of poisons should be issued, and this of course would entail a system of periodical inspection, either by officials of the Government, or by representatives of the Pharmaceutical Council.

I think it will be generally acceded that the surest guarantee for the exercise of judgment and care in the disposition and preservation, as well as in the dispensing of dangerously potent medicines, is the sense of the responsibility which every conscientious pharmacist must feel that his position and duties impose upon him; this realization will have surely led him to adopt, at least to some extent, if not in their entirety, the admirable recommendations of the Pharmaceutical Society, which you very appropriately reproduce in your leader of November 24.

The two questions which immediately present themselves when the desirability of compulsory poison regulations, and consequent periodical inspection, is discussed, are, firstly, is such a course necessary? and, secondly, is it practicable? These two queries I would unhesitatingly answer in the negative.

Firstly, with regard to the necessity; I think that the phenomenal rarity of fatal accidents, due to errors on the part of dispensing chemists (and it is of course in relation to this class alone that I am discussing the subject), demonstrates clearly that this much maligned and much enduring class is not oblivious of the important character of its functions, and the responsibility which they entail; I can only remember one instance, in which, from the proximity of the bottles, P. nucis. vom. was given instead of P. jalap, and a fatal result ensued. Undoubtedly there was carelessness, and the censure of the jury was richly deserved, but an isolated case of this kind merely serves to illustrate the carefulness which characterizes the body as a whole. It seems to me that there is absolutely no necessity for the recommendations to be replaced by "regulations," and certainly I see no reason why a class already sufficiently harassed in all conscience, should ask for an additional yoke to be placed upon it.

But when we come to the second query, as to the practicability, we find it bristling with difficulties. To begin with, I should not envy the task of those who had to decide as to what preparations must be kept under lock and key; whether tr. nuc. vom. might safely stand on the same shelf with tr. croci, or whether ext. hyoscy. ought not to be rigorously confined, in company with the extracts of aconite and belladonna, and so on. But this is not the most important point; evidently the system of inspection, which would follow, as a matter of course, upon the issue of compulsory regulations, is the principal feature, and since it is the fashion to make comparisons between the continental and English practice of pharmacy (usually unfavourably to the latter), it may not be without interest to refer to the custom in vogue in France and Italy with regard to this particular subject.

In France the most powerful drugs are supposed to be kept under lock and key, and an annual visit is made by the authorities to see that these and other regulations are carried into effect. I have a very distinct remembrance of this process when, a short time ago, I was assistant in one of the principal Parisian pharmacies. On a certain day (the probable time of their visit was well known) two venerable individuals entered the pharmacy. They were received with elaborate courtesy, and conducted at once by the manager to the poison cupboard; it was opened, and there stood the liq. arsenicalis side by side with liq. strychn., etc., etc. What could be more satisfactory? After an exchange of polite phrases, the two inspectors departed, their visit having lasted about five minutes. A process like this certainly cannot be said to be either inconvenient or irritating; as to its efficiency and value, I do not feel called upon to express an opinion.

In Italy, so far as I can ascertain, the Council of Health has the power to order an inspection of a pharmacy, both to ensure the genuineness of the drugs and the efficiency of the poison department, but it appears to be very rarely exercised. I cannot help feeling very strongly the opinion that while in England such an inspection would not be of any real value, seeing that any so disposed could probably evade or discount its operation, it might possibly be a source of great inconvenience and exasperation. I should like to add, with reference to the comparison between English and continental pharmacies to which I have alluded, that so far as my experience goes, a good representative English pharmacy would singly hold its own against any in France or Italy (I cannot speak of those in Germany), whether as regards the general arrangements and appointments, or with reference to the more important feature of accuracy and carefulness in the dispensing of prescriptions.

64, *Via Condotti, Rome.* T. Edward Barrass.

Sir,—It was not my intention to trouble you again with any further observations upon the Compulsory Poison Regulations question, which has been so unnecessarily drawn to the front by Dr. Symes, hoping that when brought before the Council the undesirability of its introduction might, after cool discussion in open court, be so distinctly set forth that it would there and then die a natural death. But the action of the Council in declining thus to consider it has unfortunately given Dr. Symes the opportunity of posing as a martyr, and, as usual in such cases, to arouse attention to the subject which under other circumstances would probably have passed into oblivion without further comment.

Dr. Symes tells us that he brought the subject forward in order "to assist the Council in its deliberations when the subject came to be considered." But by whom have those deliberations been demanded? Certainly not, so far as my knowledge extends, by the public or the trade. But the over-sensitive imagination of our Councillor seems to have been searching into the deep archives of the Privy Council Office, and there to have discovered the great secret and cause of our past failures in obtaining legislative protection against our common enemies, the "Co-operative Stores," and in his wisdom he comes to the conclusion that if only we will prostrate ourselves before the Government and humbly acknowledge the error of our ways, and the folly of those who so strenuously fought against the imposition of these regulations in 1871, the said Government will, without delay, accept our repentance, and proceed to enact such laws as will at once relieve us of further trouble with the "Stores," and even possibly "cutting chemists," and forthwith land us in the elysium of prosperity and peace. Such seems to be the gist of Dr. Symes's action, but a more delusive and erroneous idea it is difficult to conceive.

May I seriously ask, What has occurred since 1871 to render such a supposed demand imperatively necessary? Have cases of accidental poisoning owing to errors in dispensing multiplied tenfold? Have murders and suicides through scheduled poisons purchased of chemists increased fiftyfold? I trow not. But what has occurred? Education has been extending "all along the line;" men after careful study and preparation have successfully passed the required examinations, and armed with their diploma of qualification, have duly established themselves in businesses all over the country. That the influx of such men into the business renders the safety of the public as regards the sale and use of poisons by chemists more precarious than was the case in 1871, when these regulations were so distinctly rejected, is surely nothing short of a gratuitous insult to the trade at large, and it is to be hoped will be so recognized and repudiated to a man.

Let it not be said that the opponents to compulsory poison regulations advocate looseness and indifference as to the precautions needed in the storage, sale and use of such articles. On the contrary, many of those who took the foremost position in the opposition in 1871 were chemists of the highest standing, whose pharmacies would bear the closest scrutiny, and would be regarded as models

of careful arrangement. But there is a wide difference between the voluntary adoption of such precautions against accident, as experience and judgment may dictate as necessary, and the enforced observance by law of hard and fast rules and regulations, which, as Mr. Proctor so ably proves in a recent Journal, would of necessity be pregnant with absurdities on their very face. In addition to which, there would be the annoyance of being ever subject to the scrutinizing eye of the Government inspector, together with the disgrace which, in the eyes of the public, would be attached to the unfortunate delinquent, against whom a conviction might be obtained with fines and penalties for non-observance of such rules.

Another point of view seems to me worth a passing notice. Who amongst us who had the privilege of assisting in defeating the Council and the Government in 1871, can forget the strong feelings which were aroused at that time among members of the trade? Who can forget the feeling of regret (in one sense), when the name of our deservedly ever-esteemed friend George Sandford, then President, instead of standing as heretofore at the head of the poll at the election of Council, was found at the very bottom, owing to his support of such rules? Who again was not grieved when one of our leading members was compelled to resign his connection with the Society, owing to the unguarded impulse of heated controversy? Is it desirable, in these days of hard competition and petty jealousies (without the most absolute necessity), to repeat these scenes by throwing another ball of contention amongst us? Surely not; for rather would I most seriously urge upon our fraternity, and our trade press, to abstain from supporting any action, either at annual meetings, special meetings or otherwise, by which the initiative would be taken by ourselves in asking the Government to enforce a law which experience abundantly proves is unnecessary and uncalled for.

154, *Marine Parade, Brighton.* EDWIN B. VIZER.

THE BENEVOLENT FUND.

Sir,—The recent election of a smaller number of annuitants than usual on the Benevolent Fund of the Pharmaceutical Society, and the perusal some time since of a statement issued by the Secretary that out of about thirteen thousand persons on the Register *more than ten thousand* are non-subscribers to the Fund, have induced me to address the Council of the Society on a subject that has for some time occupied my attention.

It appears to me that this apathy on the part of the persons to whom the Fund exclusively belongs, might be to some extent dispelled if an active canvass for subscriptions were made in large towns. I am aware that this is already done in some provincial towns by local secretaries, but, so far as I know, no volunteer effort has been made in that direction in London.

The scheme that I have suggested to the Council of the Pharmaceutical Society is that London should be divided into the half-mile squares indicated by the cross lines on the Post Office Directory Map, and that a volunteer should be got in each of those squares to canvass for subscriptions for the Fund within the area of that section.

My suggestion is under the consideration of the Council, and, I am given to understand, is being favourably entertained; but I think it would strengthen the hands of the Council if some general expression of opinion were manifested and if volunteers were at once forthcoming. I have, therefore, determined to address you in the hope that you will ventilate the subject in your Journal, and that you will suggest to those gentlemen who are willing to take the matter up the desirability of sending their names to the Secretary of the Pharmaceutical Society with an offer of assistance.

36, *Camden Square.* T. C. W. MARTIN.

CHEMICAL FORMULÆ.

Sir,—I have read with much interest Professor Dunstan's very fair statement of his case in the Journal of December 1. If the expression H_2O simply meant 18 parts by weight of water, it would be quite correct to write $\frac{1}{2}H_2O$; but it means a molecule consisting of two atoms H, with one atom O, and as atoms cannot be divided, $\frac{1}{2}H_2O$ is not a legitimate expression. It may be allowable to write $\frac{1}{2}$ aq. I dissent altogether from Professor Dunstan's statement of chemical theory. It virtually amounts to this, that we know nothing of the molecules of substances which are liquid or solid, and that we may therefore play fast and loose with their formulæ, and write them any way we please. This dependence on vapour density may very easily be carried too far. In ninety-nine cases out of a hundred the vapour density simply confirms the formula which has been arrived at by other means. The formula $SbOKC_4H_4O_6$ does not mean "323 parts by weight of tartar emetic." That formula represents the molecule of tartar emetic, as it is, to the best of our knowledge, constituted. The molecule cannot have a simpler constitution, and there is no reason in the world for supposing it to be more complex. We have other means of deciding on the formula of a compound besides vapour density, such as the basicity of acids, synthetical formation, etc., and it is only by taking one consideration with another that we can arrive at a satisfactory result. Allowing that the law of Avogadro renders the vapour density conclusive evidence of the molecular weight of a body for the temperature at which the determination is made, we may have a high degree of probability amounting nearly to certainty in the case of compounds which cannot be vaporized without decomposition. We are pretty confident, for instance, that KOH is the correct molecular formula of caustic potash. In fine, what I submit is this, that these formulæ have a definite meaning according to the atomic theory, and no one has any right to use them in another sense.

Edinburgh. D. B. DOTT.

HALF AND HALF CHEMICAL FORMULÆ.

Sir,—One word as a question to Professor Attfield. He asserts:—"But when a writer intends, as all but one in ten thousand do, that the letter O also stands for one atom of oxygen, and H_2O for one molecule of water, then $\frac{1}{2}H_2O$ becomes nonsense and non-science."

I respectfully inquire, upon what grounds are we to suppose that any chemist who ever made use of such an expression as $\frac{1}{2}H_2O$ intended that the letter O should stand "for one atom of oxygen and H_2O for one molecule of water?"

Southampton Row, W.C. J. GRANTLEY TINGLE.

NOTE ON EUONYMIN.

Sir,—Having had barium carbonate reported to be in use as a diluent for euonymin, I examined a few samples (obtained in the retail trade), and of twelve samples find four containing about 20 per cent. of that substance, which can scarcely be looked upon as a normal constituent of the bark of euonymus or a legitimate addition to the manufactured article.

From information kindly supplied by one of the makers, it would appear that, in order to preserve euonymin in the form of a powder, the addition (to the alcoholic extract) of twice its weight of some absorbent powder is necessary, and that such an addition has always been made. This would appear to be the general practice, for no sample I have examined has been soluble to a greater extent than 35 per cent. in rectified spirit.

I failed to find barium carbonate in samples of brown euonymin, and as its use as part of the necessary diluent in green euonymin would not appear to be generally known, and is very objectionable, I wish to draw attention to the fact of its occurrence.

8, *Halkin Street West, S.W.* S. R. POWELL.

A. Pumphrey.—Thanks for the information.

S. J. W.—One of the labels would involve liability to stamp duty on account of the statement that the preparation can be used for the relief of an ailment of the human body, the other, probably, because of the use of the word "only."

J. A. Wheldon.—(1) *Leskea polycarpa.* (2) *Hypnum molluscum.* (3) Not named at present. (4) *Dichodontium pellucidum.*

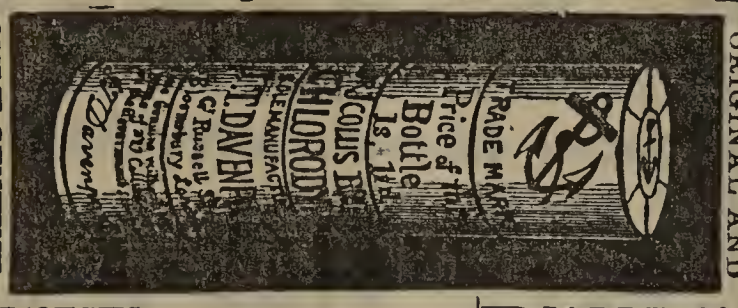
F. T.—Yes.

Chemicus.—Apply to the Secretary of the Chemical Society, Burlington House, W.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Templeton, Fritz, Inquirer, Pharmacist, Indignans, S. R. P., A. W.

THE ORIGINAL AND ONLY GENUINE.

DR. J. COLLIS BROWNE'S CHLORODYNE

ONLY GENUINE.  ORIGINAL AND

COUGHS, COLDS, ASTHMA, BRONCHITIS.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Dr. J. C. BROWNE (late Army Medical Staff) DISCOVERED a REMEDY to denote which he coined the word CHLORODYNE. Dr. Browne is the SOLE INVENTOR, and, as the composition of Chlorodyne cannot possibly be discovered by Analysis (organic substances defying elimination), and since the formula has never been published, it is evident that any statement to the effect that a compound is identical with Dr. Browne's Chlorodyne *must be false.*

This Caution is necessary, as many persons deceive purchasers by false representations.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Vice Chancellor Sir W. PAGE WOOD stated publicly in Court that Dr. J. COLLIS BROWNE was UNDOUBTEDLY the INVENTOR of CHLORODYNE, that the whole story of the defendant Freeman was deliberately untrue, and he regretted to say it had been sworn to.—See *The Times*, July 13th, 1864.

IS THE GREAT SPECIFIC FOR CHOLERA, DIARRHŒA, DYSENTERY.

GENERAL BOARD of HEALTH, London, REPORT that it ACTS as a CHARM, one dose generally sufficient.

Dr. GIBBON, Army Medical Staff, Calcutta, states: "2 DOSES COMPLETELY CURED ME of DIARRHŒA."

From SYMES & Co., Pharmaceutical Chemists, Simla. *Jan.* 5, 1880.

To J. T. DAVENPORT, London.

DEAR SIR,—We congratulate you upon the widespread reputation this justly-esteemed medicine has earned for itself all over the East. As a remedy of general utility, we much question whether a better is imported, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances *ad infinitum* of the extraordinary efficacy of DR. COLLIS BROWNE'S CHLORODYNE in Diarrhœa and Dysentery, Spasms, Cramps, Neuralgia the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than Collis Browne's, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than Collis Browne's is a deliberate breach of faith on the part of the chemist to prescriber and patient alike.—We are, Sir, faithfully yours, SYMES & CO., *Members of the Pharm. Society of Great Britain, His Excellency the Viceroy's Chemists.*

DR. J. COLLIS BROWNE'S CHLORODYNE is the TRUE PALLIATIVE in NEURALGIA, GOUT, CANCER, TOOTHACHE, RHEUMATISM.

DR. J. COLLIS BROWNE'S CHLORODYNE is a liquid medicine which assuages PAIN of EVERY KIND, affords a calm, refreshing sleep WITHOUT HEADACHE, and INVIGORATES the nervous system when exhausted.

DR. J. COLLIS BROWNE'S CHLORODYNE rapidly cuts short all attacks of EPILEPSY, SPASMS, COLIC, PALPITATION, HYSTERIA.

IMPORTANT CAUTION.—The IMMENSE SALE of this REMEDY has given rise to many UNSCRUPULOUS IMITATIONS. Be careful to observe Trade Mark. Of all Chemists. 1s. 1½d., 2s. 9d., and 4s. 6d.

SOLE MANUFACTURER,
J. T. DAVENPORT, 33 Gt. Russell St., W.C.

THE ORIGINAL AND ONLY GENUINE.

IMPORTANT DECISIONS.

Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

FURTHER IMPORTANT NOTICE.

The subjoined list of eminent Firms concur with Vice-Chancellor Sir W. Page Wood's statement in Court that Dr. Collis Browne was undoubtedly the Inventor of Chlorodyne; and that when Chlorodyne, or the Original Chlorodyne, is ordered, they invariably supply Dr. J. Collis Browne's :—

Apothecaries' Hall	London.	Frazer & Green	Glasgow.	Morson, T., & Son	London.
Allen, Hanbury & Co.	,,	Gale & Co.	London.	Newbery & Sons	,,
Baiss Brothers	,,	Giles & Son	Clifton.	Oldham, G., & Co.	Dublin.
Banks & Richards	Birmingham.	Goulding, Messrs.	Cork.	Parsons & Richardson	Leicester.
Barron, Harveys & Co.	London.	Grattan & Co.	Belfast.	Peake, Allen & Co.	Dublin.
Bell, John, & Co.	,,	Grimwade, Ridley	London.	Raimes & Co.	Edinburgh.
Corbyn & Co.	,,	Grindley & Son	Chester.	Sang & Barker	,,
Cox & Gould	,,	Hearon, M'Culloch & Co.	London.	Sanger, J., & Sons	London.
Curling & Co.	,,	Hodgkinson, Tonge & Stead	,,	Sim, James, & Co.	Aberdeen.
Davy, M'Murdo & Co.	,,	Hopkins & Williams	,,	Smeeton, W.	Leeds.
Dobbin, W., & Co., Limited	Belfast.	Hovenden, R., & Sons	,,	Southall & Co.	Birmingham.
Drew, Barron & Co.	London.	Johnson, J. H. & S.	Liverpool.	Sutton, W., & Co.	London.
Drew, B., & Alexander	,,	Langton, W., & Co.	London.	Tomlinson, Hayward & Co.	Lincoln.
Dunn & Company	,,	Lynch & Co.	,,	Treacher, Hodgkinson & Co.	London.
Edwards, W.	,,	Mackay, John, & Co.	Edinburgh.	Westwood & Hopkins	,,
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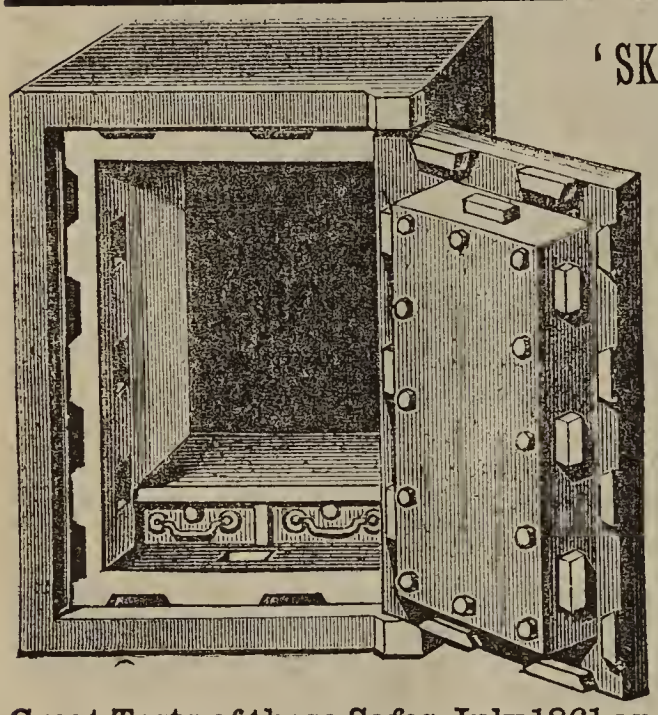

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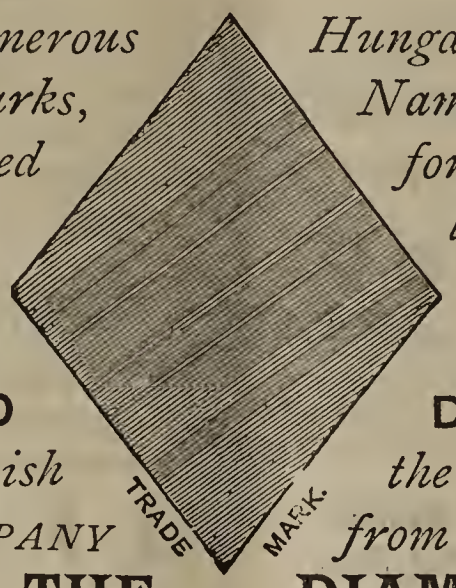

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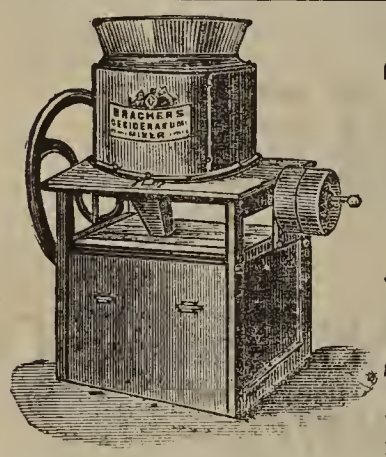

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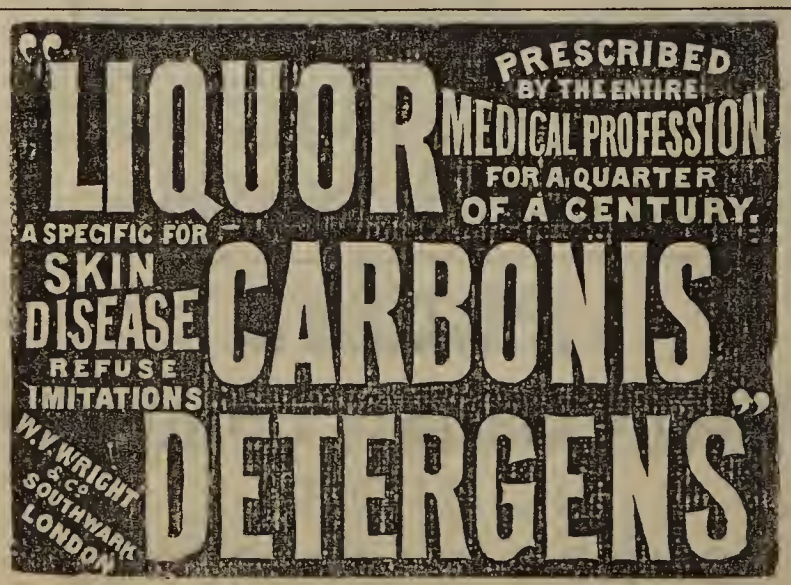

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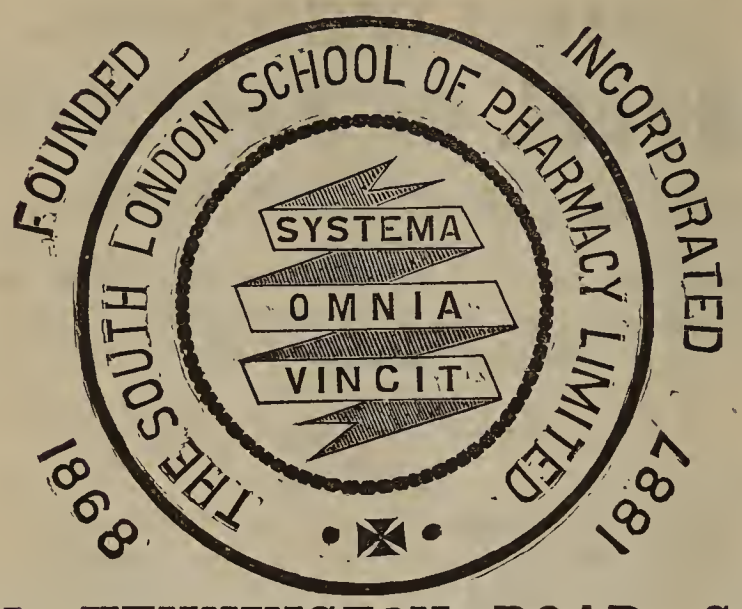

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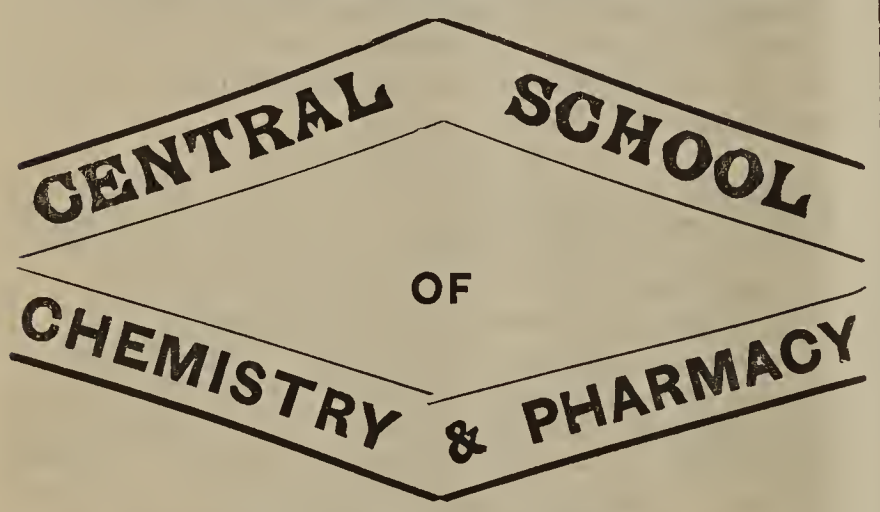

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The Pharmaceutical Journal AND Transactions.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

CHRISTMAS VACATION.

The Library and Museum in London will be closed from 2 p.m. on Saturday, December 22nd, until 9 a.m. on Thursday, December 27th, and will not be open in the Evening from Thursday, December 27th, to Tuesday, January 1st, both dates inclusive.

The Society's House in Edinburgh will be closed on Christmas Day, and also on New Year's Day. It will not be opened in the Evening from Wednesday, December 26th, to Monday, December 31st, both dates inclusive.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

EVENING MEETING,

36, YORK PLACE, EDINBURGH.

An EVENING MEETING of the Society will be held in the Society's House, 36, York Place, Edinburgh, on Wednesday, December 26th, at 8.30.

Mr. WILLIAM GILMOUR, F.R.S.E., in the chair.

PROCEEDINGS :—

"Cow's Milk ; a probable source of danger."
By ADAM GIBSON, F.C.S.

"Recent additions to the Museum."
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WANTED.—The PHARMACEUTICAL JOURNALS for April 24th, 1875, No. 252, and for January 27th, 1883, No. 657. Full price will be paid by the Secretary, 17, Bloomsbury Square, W.C.

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 11 a.m., on the second Tuesday in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

* A Certificate of having passed any of the examinations approved by the Council (a list of which may be obtained from the Registrar) will be accepted in lieu of this Examination, provided Latin, Arithmetic, and English were included in the subjects of the Examination for which the Certificate was granted.

The Certificate must be forwarded to the Registrar, with the fee of Two Guineas, for the approval of the Board of Examiners, and must be so approved before the Candidate is eligible to enter his name for the Minor Examination.

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OF THE

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Alet	10/	..	50	38/	..	..	Mont Dore	10/	..	50	40/	..	..
Apollinaris	6/3	5/	50	25/	100	39/	**Oberbrunnen**	**10/**	..	**50**	**40/**	..	..
Birmensdorf	12/	..	50	48/	..	..	**Orezza**	**12/**	..	**30**	**28/**	..	..
Bonnes	12/	10/	50	48/	50	40/	**Pullna**	**12/**	**8/**	**40**	**36**	**40**	**25/**
Bourboule (La)	**11/**	..	**50**	**42/**	..	..	Roisdorf	6/	..	50	25/	..	..
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Condal	..	14/	..	..	50	56/	**Rubinat**	**15/**	..	**25**	**30/**	..	..
Contrexeville "Le Cler"	**8/**	..	**50**	**32/**	..	..	St. Boës	12/	..	50	48/	..	..
Do. "Pavilion" ..	9/	..	50	35/	..	..	**St. Galmier** Badoit (Still) .	**6/**	..	**50**	**22/**	..	.
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Flitwick	12/	..	..	..	..	.	St Moritz	12/	..	50	48/	..	..
Friedrichshall	13/	10/	25	25/	50	40/	Salvator	..	9/	..	..	50	36/
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Do. claret-shape „	8/	5/	50	29/	100	36/	**Selters**	**6/**	**4/**	**50**	**23/**	**50**	**16/**
Homburg	10/	..	50	38/	..	..	Sulis	6/	5/	50	23/	100	36/
Hunyadi-Janos	15/	13/	25	30/	50	50/	Tarasp	12/	..	30	28/	..	..
Johannis-Brunnen	6/	5/	50	23/	100	36/	Taunus	5/6	4/6	50	22/	100	32/
Kissengen	11/	..	50	45/	..	..	**Vals** (Société Springs)	**8/6**	..	**50**	**32/**	..	..
Kreuznach	11/	..	50	45/	..	..	**Vichy** (State Springs)	**8/6**	**7/6**	**50**	**32/**	**50**	**28/**
Kronenquelle	**10/**	..	**50**	**40/**	..	..	**Victoria Ofner**	**14/**	**10/**	**25**	**27/**	**50**	**38/**
Marienbad	10/	..	50	38/	..	..	Wildungen	10/	..	50	40/	..	—

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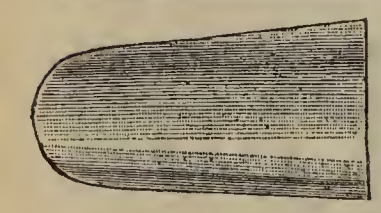

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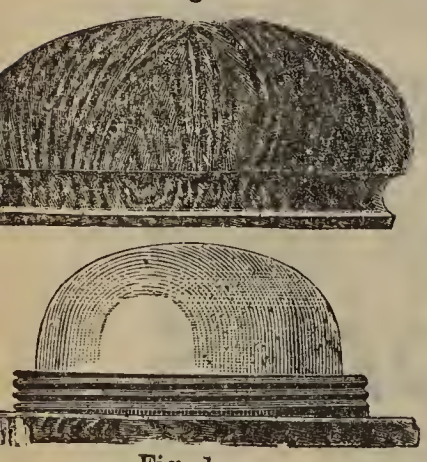

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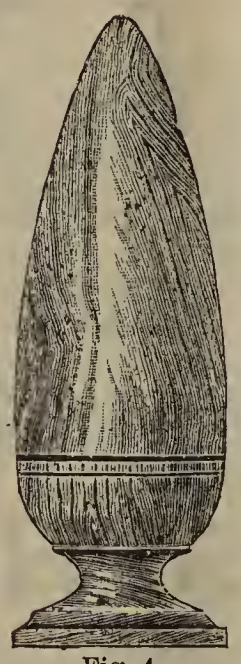

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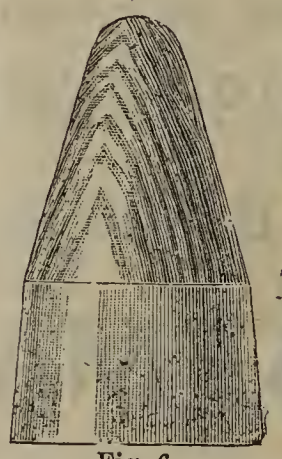

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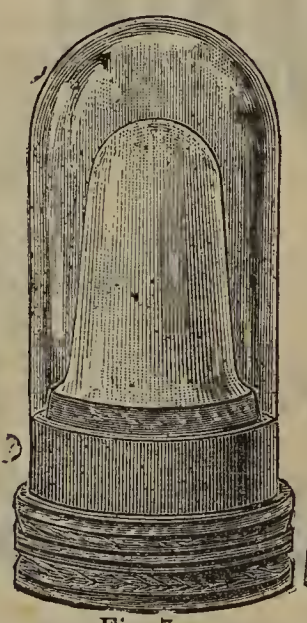

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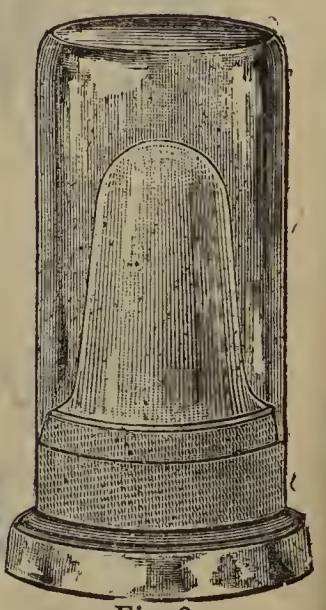

Fig. 8.

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Fig. 3 & 4.	In Boxwood Cases, per doz., 2/8 and 4/-; in Vegetable Ivory	„ **4/- and 6/-**
Fig. 5.	In White Opaque Glass Jars, with Red Celluloid Caps	„ **2/6 and 3/6**
	Mounted, in Stoppered Bottles	„ **6/6**
Fig. 6.	Mounted on Vegetable Ivory, in Glass Bottles, Screw Metal Caps	„ **4/6**
Fig. 7.	On Boxwood Mounts, Glass Covers	„ **3/6 and 5/9**
	On New Glass Mounts, Glass Covers	„ **3/6, 4/,- 5/6, 8/-**
Fig. 8.	On Glass Mounts with Glass Covers	„ **4/6 and 6/-**

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Atropin Sulph.	1-150, 1-100 and 1-60 gr.	Morphine Bi-Meconate	1-8, 1-6, 1-4, and 1-3 gr.
Caffein Sodio-Salicylate	1-2 gr.	Morphine Sulphate	1-12, 1-8, 1-6, 1-4, 1-3 and 1-2 gr.
Codein Phosphate	1-4 gr.	Morphine & Atropin combinations.	
Cocaine	1-6 gr. and 1-2 gr.	Pilocarpin	1-10, 1-3 and 1-2 gr.
Colchicin	1-100 gr.	Quinine Hydrobromate	1-2 gr.
Cornutin	1-60 gr.	Sclerotinic Acid	1-2 and 1 gr.
Curare	1-12 gr.	Strophanthin	1-500 gr.
Digitalin	1-100 gr.	Strychnine	1-150, 1-100 and 1-60 gr.
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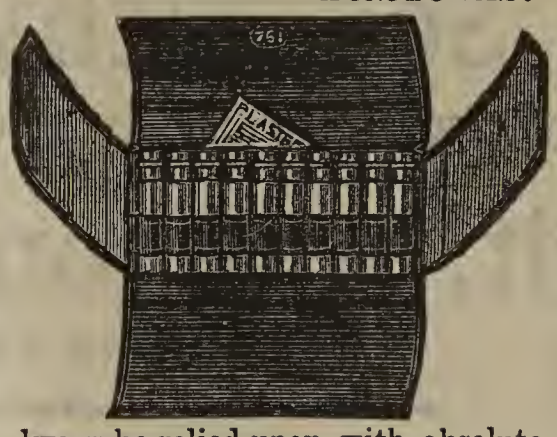

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Morphine Sulph., 1/20 and 1/8 gr.
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CONTRIBUTIONS TO THE CHEMISTRY AND PHARMACOLOGY OF THE NITRITES OF THE PARAFFIN SERIES.*

[*Communications I. to IV. are from the Research Laboratory of the Pharmaceutical Society.*]

I. INTRODUCTORY.

BY WYNDHAM R. DUNSTAN, M.A., F.C.S.,

Professor of Chemistry to the Pharmaceutical Society and Director of the Research Laboratory.

A special interest attaches to the therapeutical employment of the nitrites, since it is conditioned by a specific physiological action which has been minutely investigated. This action is characterized principally by a remarkable fall in the blood-pressure consequent on the dilation of the arterial vessels, by an accelerated motion of the heart, and by a quickening of the pulse. An important alteration, first observed and investigated by Gamgee (*Phil. Trans.*, 1868), is also effected in the red blood corpuscles through the formation of the so-called methæmoglobin, which gives to the blood a chocolate colour. This oxidized form of hæmoglobin does not readily lose oxygen, and hence processes of oxidation in the body, which are normally effected by oxyhæmoglobin, are retarded.

All these effects are only temporary; that on the blood disappears, owing to the slow reduction of the methæmoglobin to hæmoglobin by the unoxidized constituents of the blood-plasma.

These general features are common to the physiological action of all bodies which contain, or under certain conditions are capable of giving rise to, the nitrite group (·ONO). The problem which has interest alike for the chemist and physiologist is that which relates to the physiological influence exerted on this specific nitrite action, by elements or groups of elements which in the various inorganic and organic nitrites are attached to the nitrite radical. Sufficient is known about the physiological action of potassium and sodium salts to enable us to understand the difference between the effects of the nitrites of potassium and sodium. Little, however, is known about the effect exercised by the union to the nitrite group of the different organic radicals. No definite statement can be made as to the action of each of the paraffinoid nitrites, all of which, so far as they have been investigated, are observed to give rise to the same general nitrite effect, modified however in different ways and to different extents, by the presence of variously constituted radicals. The first step towards the solution of the problem must be the preparation of these compounds in a pure state. Insufficient importance has in general been attached by the physiological experimentalist to the necessity of working with an absolutely pure material. Too frequently material has been employed which, to say the least, is of doubtful purity, having been purchased in commerce as pure, and assumed to be so without adequate experimental evidence. It is rare to find that substances, previous to their physiological investigation, have undergone such an examination at the hands of a scientific chemist as will serve to establish their purity. It is clear that the pharmacology of the future must be the pharmacology of chemically pure compounds, and it is hard to see how pharmacological investigation can be successfully conducted except through the conjoint labours of the chemist and the physiologist.

The pharmacological investigation of certain of the organic nitrites is likely to furnish therapeutics with results of the highest importance, and it is more especially to some of these compounds that attention has first been directed in the course of the present research which was commenced about a year ago. It has been necessary to prepare and examine several nitrites which have not hitherto been obtained or have been but little examined. Experiments were first made with ethyl nitrite, and in April last a paper on the preparation and properties of this substance was communicated to this Society (*Pharm. Journ.*, April 14, 1888). These results need not be alluded to here further than to remark that a method was proposed for the preparation of what was proved to be pure ethyl nitrite, and it was shown under what conditions it can be stably kept in solution. A highly impure solution of ethyl nitrite has long been employed as a medicinal remedy, and a solution of this kind is still included in the British Pharmacopœia (spiritus ætheris nitrosi). Since it is almost certain that any therapeutical action which this liquid may exert is principally, if not entirely, due to the ethyl nitrite it contains, there seems to be no reason why the impure solution should not now be advantageously replaced by a solution of pure ethyl nitrite of known strength, thus placing at the disposal of the physician a remedy from which a constant effect may be expected. Before this substitution can be effected it is necessary that a careful comparison should be made of the therapeutical effects produced respectively by the impure and pure liquids. Professor Leech, who has already made a special study of the therapeutical properties of the Pharmacopœial solution (*Practitioner*, xxxi., 241), kindly undertook the work, and the results he has obtained are recorded in a following paper.

In the present communication an account is given of the preparation and properties of some of the homologous nitrites of the paraffin series, namely, those of iso-butyl and amyl. These nitrites were selected as a starting point on account of their importance in connection with the employment of the so-called amyl nitrite in therapeutics. The therapeutical value of amyl nitrite appears to be unquestioned, and it is interesting to recall here the circumstances which attended the introduction of this compound into medicine, as a remedy for angina pectoris and certain other forms of cardiac disease. Dr. Lauder Brunton had concluded from the sphygmographic tracings taken from the pulse of a patient suffering from angina pectoris, that during the attacks the arterial vessels contracted, and the blood pressure rose. Being aware of the fact that the administration of amyl nitrite brought about a dilation of these vessels, and therefore a fall in the blood pressure, it seemed to him that this compound might prove useful in angina by diminishing arterial tension. Experiment proved this to be the case, and amyl nitrite is one of the few drugs whose introduction into therapeutics has been due to the direct application of a known physiological action. Although much work has been done with respect to the physiological and therapeutical action of amyl nitrite, it appears that the amyl nitrite used in

* Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Thursday, December 13.

these investigations has always been derived from rectified fusel oil, and there is no evidence to show that any experimentalist has used pure amyl nitrite or even that a liquid of the same composition has been employed by different observers. The assumption has apparently been made that the fraction of the commercial nitrite, prepared from more or less rectified fusel oil, which distils between 90°–100° or 95°–100°, represents the pure compound. For rough or preliminary experiments, and particularly in those which aim at demonstrating the specific nitrite-effect of the compound, this fraction may perhaps be sufficiently definite in its composition, but in experiments through which it is attempted also to determine the influence of the amyl (C_5H_{11}) group, a perfectly pure substance should have been used. It is therefore of both scientific and practical importance to isolate the various nitrites which are contained in the so-called amyl nitrite, and to determine precisely the physiological action of each after it has been prepared in the pure state. In order to render quite intelligible the practical bearing of the work it will be necessary to state what is already known about the composition of the amyl nitrite at present made use of for therapeutical purposes.

According to the British Pharmacopœia, "amyl nitrite" is "a liquid produced by the action of nitric or nitrous acid on amylic alcohol, which volatilizes between 262°-270° F. (or about 128° to 132° C.). It consists chiefly of nitrite of amyl $C_5H_{11}NO_2$." It is described in the Pharmacopœia as "an ethereal liquid of yellowish colour, and peculiar, not disagreeable, odour. Specific gravity about ·880. Submitted to distillation about 70 per cent. passes over at 194° to 212° F. (90°-100° C.)." From this description it is obvious that "amyl nitrite" is very far from being a homogeneous substance; in fact it is a mixture of several substances in indefinite proportions. It is said to contain besides amyl nitrite, nitro-pentane, amyl nitrate, amyl alcohol, valeric aldehyde and valeric acid, etc., but apparently no complete analysis of the liquid has been made. A consideration of the composition of commercial amyl alcohol is likely to throw light on the possible constituents of the "amyl nitrite" prepared from it.

The amyl alcohol of commerce is obtained from fusel oil by a limited application of the process of fractional distillation. The chief constituents of fusel oil are certain of the homologous and isomeric alcohols of the paraffin series, namely :—

Ethyl alcohol: CH_3CH_2OH, b.p. 78·4°.
Primary propyl alcohol: $C_2H_5CH_2OH$; b.p. 97·4°.
Iso-butyl alcohol: $CH(CH_3)_2CH_2OH$; b.p. 108·4°.
α-amyl alcohol: $CH(CH_3)_2CH_2CH_2OH$; b.p. 131°.
β-amyl alcohol: $CH(C_2H_5)CH_3CH_2OH$; b.p. 128°,

besides which a hexyl alcohol is probably present, boiling at about 151°.

To prepare the amyl alcohol of commerce fusel oil is distilled with or washed with water (or a saturated solution of sodium chloride), and then fractionally distilled; the fraction which passes over between 127°-132° constitutes "amyl alcohol." The respective quantities of the isomeric alcohols which are contained in it largely depend on the number of successive fractional distillations to which the liquid has been submitted. Commercial specimens vary greatly in this respect. Many of them, having been very imperfectly rectified, contain more than one of the lower homologues in addition to the two amyl alcohols. When such "amyl alcohol" is converted into the nitrite it is reasonable to suppose that there would be formed the nitrites which correspond to the alcohols it contains, namely α- and β-amyl nitrites, iso-butyl nitrite, and perhaps propyl nitrite. If nitric acid has been used to prepare the nitrites, it is to be expected that the corresponding aldehydes and acids will also be formed, viz., valerianic and butyric acids, etc., and in addition the alkyl salts derived from these acids, viz., amyl valerate and butyrate, etc. For the statement that nitropentane is present there appears to be no experimental evidence. In fact this compound cannot be present, since it is not producible by the reaction of either nitrous or nitric acid with amyl alcohol. It is remarkable that the possible presence in "amyl nitrite" of these lower nitrites, *i.e.*, of iso-butyl and propyl, has apparently not been suggested by previous writers on this subject.

From what has been said, it will be seen that before an examination of the constituents of commercial amyl nitrite can be attempted, it is necessary to become familiar with the physical and chemical characters of iso-butyl nitrite and the two amyl nitrites. Of iso-butyl nitrite little is known; conflicting statements exist as to its properties. The nitrites of α-amyl alcohol and of β-amyl alcohol have never been separately obtained; a mixture of the two nitrites was prepared, from rectified fusel oil, by Balard, Guthrie and others, though these observers do not ascribe the same physical constants to the mixture. The separation of these nitrites is in fact a very difficult and tedious operation, on account of the great chemical and physical similarities of the two alcohols, each of which must first be isolated before the nitrites can be prepared. They cannot be separated by fractional distillation, since there is, at the most, a difference of only 3° in their boiling points; in physical properties they are almost identical, except that while α-amyl alcohol, which occurs in fusel oil to the larger extent, is inactive, β-amyl alcohol is lævorotatory. The preparation of each of the corresponding nitrites is however to be desired, both on chemical and pharmacological grounds, and after several months of continuous work spent in separating the two alcohols, as described in a subsequent paper, α-amyl nitrite was obtained pure. β-amyl nitrite is still being investigated for its chemical interest, although for the purposes of preliminary physiological experiments it is probably sufficient to have obtained one of these nitrites in a pure state, since by a comparison of the physiological properties of α-amyl nitrite with those of a mixture of α- and β-amyl nitrites, it may be possible to infer the physiological action of the β-compound. The physiological actions of these pure nitrites are being investigated by Dr. Theodore Cash, F.R.S., Professor of Materia Medica in the University of Aberdeen.

It appears likely that this inquiry will have an important bearing on the therapeutical use of amyl nitrite, since it ought to be possible in the light of the results to employ that compound which is shown to be the most active, to the exclusion of those substances which are valueless. Nothing can be more unsatisfactory than the indefinite mixture which is at present used. According to the British Pharmacopœia amyl nitrite may contain from

30–40 per cent. of various substances other than amyl nitrite, the nature of these other substances being dependent not only on the composition of the amyl alcohol originally used, but also on the employment of "nitric or nitrous acids," either of which, according to the Pharmacopœia, is admissible in preparing amyl nitrite. The experiments made by Mr. J. Williams (*Pharm. Journ.*, [3] xvi. 499) have already demonstrated the importance of causing "nitrous acid," and not nitric acid, to react with the alcohol. The action of nitric acid must inevitably lead to the formation of oxidation products of the alcohols; in fact, the quantity of these products must be proportional to that of the amyl nitrite formed. Having regard to these facts it is not surprising to find that a constant therapeutic effect has not been observed to result from the employment of "amyl nitrite."

II. ON ISO-BUTYL NITRITE.

BY PROFESSOR DUNSTAN AND E. J. WOOLLEY.

This nitrite has been but little examined. The statements of different observers as to its boiling point are not in agreement, and therefore we thought it desirable to prepare and examine the pure substance. Two methods have previously been used to obtain it. The method of Chapman and Smith, which consists in passing nitrous fumes into iso-butyl alcohol, and that employed by Bertoni and Truffi in their research on the "Formation of Alkyl Salts by Double Decomposition" (*Gazzetta*, xiv., 23), in which iso-butyl alcohol is distilled with "amyl nitrite," and the resulting iso-butyl nitrite rectified by fractional distillation. We have prepared it by a process analogous to that which had previously been denied for the preparation of ethyl nitrite.

Iso-butyl alcohol (prepared from the iodide) was constantly fractionated until a liquid boiling between 108°-109° was obtained. The boiling point of the pure iso-butyl alcohol is 108·4°. In order to convert the alcohol into the nitrite it was gradually mixed with sulphuric acid. As soon as this mixture had cooled it was poured, in small quantities at a time, to the bottom of a solution, made by dissolving sodium nitrite in three times its weight of water, contained in a vessel which was kept cool (10°-12°) by immersion in water. The respective quantities of the reacting bodies were calculated from the equation,

$$2C_4H_9OH + H_2SO_4 + 2NaNO_2 = 2C_4H_9NO_2 + Na_2SO_4 + 2H_2O.$$

Actually a slight excess of sodium nitrite was used. Under these conditions the iso-butyl nitrite is immediately formed, and it separates as an ethereal layer on the surface of the aqueous liquid. Little or no evolution of "nitrous fumes" is observed. The layer of nitrite was decanted, washed with an aqueous solution of potassium carbonate, and finally dried by digestion with fused potassium carbonate. On distillation practically the whole of the liquid was obtained between 66°-67° (bar. 759 mm.), the entire mercurial column of the thermometer being immersed in the vapour.* The liquid was analysed by measurement in a gas-burette, containing mercury, of the nitric oxide evolved from it by reaction with potassium iodide and dilute sulphuric acid. The weight of liquid taken was 0·191 gram, and the quantity of nitric oxide obtained corresponded to 0·188 gram of iso-butyl nitrite. At 15° C. the specific gravity determined in a Sprengel tube was 0·876 (water at 15°=1). The boiling point of the liquid ascertained by a standard thermometer, the mercurial column being entirely immersed in the vapour, was 67° C. (bar. 760 mm.). Iso-butyl nitrite is a pale yellow liquid having a somewhat fragrant odour, and causing, when inhaled, flushing of the face and other disturbances. Like ethyl nitrite, it is apt to become acid when it is kept, more especially if moisture is present, and as soon as acid has been formed decomposition rapidly ensues. It may be greatly preserved from this decomposition by keeping a small fragment of sodium bicarbonate in the liquid, which at once neutralizes any acid that may be produced.

We wish to thank Mr. W. A. Salter for having confirmed these results by an independent series of observations.

Professor Cash finds that when administered to animals, iso-butyl nitrite brings about a rapid fall of blood-pressure, an acceleration of the pulse, and a powerful respiratory paralysis.

* It was noticed when the butyl nitrite is distilled that at first "nitrous fumes" escaped. "Nitrous fumes" appear to be soluble in these liquid nitrites, and are somewhat difficult to entirely remove. Prolonged digestion with sodium bicarbonate or with solution of potassium carbonate has been found to answer fairly well.

III. THE METAMERIC AMYL NITRITES.

BY PROFESSOR DUNSTAN AND W. LLOYD WILLIAMS.

The liquid which has hitherto been known to scientific chemists as pure amyl nitrite is a mixture of the metameric nitrites, corresponding to α-amyl alcohol or iso-butyl carbinol ($CH(CH_3)_2CH_2CH_2NO_2$) and β-amyl alcohol or secondary butyl carbinol ($CH(C_2H_5)CH_3CH_2NO_2$). The relative proportions of these two nitrites in the mixture are dependent on the composition of the "amyl alcohol" from which they have been prepared. The respective quantities of these two metameric alcohols contained in different specimens of fusel oil are subject to variation. The quantity of the α-amyl alcohol, which is optically inactive, is always much larger than that of β-amyl alcohol, which is lævorotatory. In the portion of fusel oil which has been repeatedly fractionated between 127–132°, there is said to be usually about 13 per cent. of the active alcohol. These alcohols cannot be separated by fractional distillation, since the α-amyl alcohol boils at 128° C. and the β-amyl alcohol at 131° C. Their separation is a matter of very great difficulty, and it has seldom been accomplished.

Our first experiments related to the properties of the mixture of these two nitrites. The statements of different observers about its properties are inconsistent, the boiling point being variously stated at almost every temperature between 90° and 99° C. These discrepancies are no doubt in part due to the employment for the preparation of the nitrites, of more or less perfectly rectified fusel oil. The fraction boiling between 127°-132° C., is known in commerce as "amyl alcohol," and unless the operation of fractional distillation has been many times repeated, the liquid is liable to contain more or less iso-butyl alcohol (b.p. 108·4°). On account of the difficulty of completely removing iso-butyl alcohol, as well as substances of higher boiling-point, from fusel oil by

distillation, we decided to make our first experiments with amyl alcohol which had been otherwise purified. Advantage was taken of the superior solubility of the barium salt of iso-butyl sulphuric acid.

About 300 grams of the fraction of fusel oil which had been repeatedly distilled between 127°-132° C. were warmed for some days with an equal quantity of sulphuric acid. The liquid was then poured into 5 litres of water. The dark oily layer which separated was removed, and the clear liquid neutralized with barium carbonate. This solution of the barium salts of iso-butyl sulphuric acid and the two amyl-sulphuric acids was evaporated to about one-third of its original volume. The salts deposited on cooling the liquid were many times recrystallized from water. By this means the more soluble barium iso-butyl sulphate was removed, together no doubt with some of the barium β-amyl sulphate, which is rather more soluble than barium α-amyl sulphate. From the mixed barium salts the alcohols were regenerated by conversion into the sodium salts, which were distilled with diluted sulphuric acid. The resulting alcohols were dried by digestion with ignited potassium carbonate and distilled. Nearly the whole of the liquid came over at 129° C. The specific gravity was ·813 at 15° C. (water at 15°=1). The rotatory power at 15° C. determined with Laurent's instrument in a column 200 mm. long was —1·35°. The maximum rotation observed by Ley in a specimen of β-amyl alcohol was —8·8° for a column 200 mm. long, so that the specimen above described contained 84·66 per cent. of α-amyl alcohol and 15·34 per cent. of β-amyl alcohol. The alcohols were now converted into the nitrites by reaction with sulphuric acid and sodium nitrite, the method used for this purpose being identical with that described in connection with iso-butyl nitrite (see p. 487). The respective quantities of the materials used were calculated from the equation

$$2C_5H_{11}OH + H_2SO_4 + NaNO_2 = 2C_5H_{11}NO_2 + Na_2SO_4 + 2H_2O.$$

The method was very successful, and the nitrites thus easily prepared were washed with a solution of potassium carbonate and dried by digestion with the ignited salt. The liquid entirely distilled between 96°-97° C. and was *dextrorotatory*. The lævorotatory β-amyl alcohol had given rise to a dextrorotatory nitrite. Le Bel (*Bull. Soc.* [2], xxv., 545) has shown that the amyl chloride, bromide and iodide prepared from the lævorotatory alcohol are also dextrorotatory.

The physiological action of the mixture of α-amyl and β-amyl nitrites thus prepared has been investigated by Professor Cash, who finds that it produces in animals a rapid fall of blood pressure, an acceleration of the pulse-rate, and a slowing of the respiratory movements, although it does not appear to act so powerfully in these respects as iso-butyl nitrite.

In order to separate these two metameric nitrites, it was necessary first to obtain the corresponding alcohols. The separation of the two alcohols was first effected by Pasteur (*Compt. Rend.*, xli., 296), by converting them into two barium amyl-sulphates, and repeatedly recrystallizing these salts from water, by which means it is possible to obtain the pure salt corresponding to the inactive alcohol, and after several further series of recrystallizations of the residual salts, that corresponding to the active alcohol; the barium salt of β-amyl-sulphuric acid being about two and a half times more soluble than the barium salt of α-amyl-sulphuric acid. This process of isolation is very laborious, and has not often been repeated; in fact, it is doubtful whether the active alcohol has yet been obtained pure, since specimens prepared by different observers have not exhibited the same rotatory power. Le Bel has proposed to separate the two alcohols by the prolonged action of gaseous hydrochloric acid, when the inactive alcohol is more readily attacked and converted into the chloride, than the active alcohol. It seems however from the experience of other observers that this method is hardly less tedious than Pasteur's, and as the latter method had already been successfully employed by Pedler, we decided to attempt to effect the separation by its means.

Fusel oil, which had been distilled with steam, was dried and fractionated. The fraction obtained between 127°-132°, after having been several times redistilled, exercised a rotation of −1° (for the D ray), in a tube 200 mm. long, at 15° C., the determination being made in Laurent's instrument. If we take—8·8° (Ley) as the rotatory power of the active alcohol under the same conditions, then this liquid was constituted of 88·64 per cent. of α-amyl alcohol and 11·36 per cent. of β-amyl alcohol. About 1½ litre was warmed for one week with an equal weight of sulphuric acid, the mixture was largely diluted with water, neutralized with barium carbonate, and filtered. The solution was concentrated and fractionally crystallized, the fractions, which were early obtained, were isolated and separately recrystallized about twenty-three times. From some of the salt thus purified the alcohol was regenerated, dried and distilled. It boiled at 129-130° C., and at 15° C. its specific gravity was ·813. The liquid was found still to possess rotatory power. At 15° C. in a tube 200 mm. long the rotation was observed to be −0·45°, so that the repeated recrystallization of the barium salts had only removed two-thirds of the active alcohol which the liquid originally contained. The regenerated liquid still contained 5·1 per cent. of the active alcohol. Since a comparison of the physiological effects of several specimens of α-amyl nitrite, associated with different amounts of β-amyl nitrite, with the physiological effect of pure α-amyl nitrite, would enable the action of β-amyl nitrite to be inferred, the above-mentioned alcohols were converted into the nitrites, and their action is being physiologically examined by Professor Cash. The nitrites boiled at 96°-97°, and the specific gravity of the liquid was 0·874 at 15° (water at 15°=1).

The remainder of the barium salts was now dissolved in a large quantity of water, and the dilute solution allowed to crystallize slowly. The salt obtained was separated from the mother-liquid and again recrystallized twelve times. The barium salt had now been recrystallized thirty-five times. On regenerating the alcohol and drying it, the boiling point was found to be 131° C. (bar. 759 mm.), the whole of the thermometric column being immersed in the vapour. The specific gravity of the liquid at 15° C. was 0·8140 (water at 15°=1). The alcohol was now practically inactive, the rotation effected in a column 200 mm. long being only one-tenth of a degree.* The nitrite was

* A specimen prepared by Pedler and recently examined by Dr. Perkin (*Journ. Chem. Soc.*, 1884, 470), exhibited

now prepared from this alcohol by the method which has been previously described, and its characters have been carefully examined. It was shown to be pure by the method which has already been alluded to. (Weight of liquid taken 0·1787 gram; pure amyl nitrite found 0·1797 gram.) The boiling point determined with a standard thermometer is 97° C. (bar. 758·5 mm.). Its specific gravity at 15° is 0·880 (water at 15°=1). The liquid was virtually inactive, showing a dextro-rotation in a tube 200 mm. long of only one-twentieth of a degree. α-amyl nitrite is a pale yellow liquid having a not disagreeable odour, and producing when inhaled the characteristic nitrite-effect. Its physiological action is being investigated by Professor Cash.

IV. THE CHEMICAL CONSTITUENTS OF AMYL NITRITE USED IN MEDICINE.

BY PROFESSOR DUNSTAN AND E. J. WOOLLEY.

The "amyl nitrite" of the British Pharmacopœia is prepared by the action of "nitric or nitrous acid" on amyl alcohol which has been distilled between 128°-132° C. The constituents of the nitrite thus obtained must be subject to considerable variation, being dependent not only on the use of "nitric or nitrous acid," but also on the composition of the crude amyl alcohol, as well as on the extent to which the operation of fractionally distilling the alcohol has been carried. From a consideration of the constituents of fusel oil or crude amyl alcohol it seemed likely that the official nitrite might contain iso-butyl nitrite, α-amyl nitrite, β-amyl nitrite, and perhaps primary propyl nitrite, although neither the nitrite of propyl nor the nitrite of iso-butyl appears to have been mentioned by previous workers on the subject as a possible constituent of the liquid. It is known that the substance contains unaltered amyl alcohol, besides oxidation products, such as valeric aldehyde and valeric acid, amyl valerate, etc., these compounds being noticed to occur to the largest extent when nitric acid is employed in the preparation of the nitrite. The employment of nitric acid has also been stated to give rise to the formation of some amyl nitrate, and the production of hydrocyanic acid has been observed. To these non-nitrite constituents, as they may be termed, we have not paid any special attention in the course of the present inquiry, since there is no evidence that the therapeutic value of the liquid is dependent on their presence.

Two specimens of the official "amyl nitrite" have been examined; both of them were obtained of well-known manufacturers. In order to separate a sufficient quantity of the constituent nitrites for identification, recourse was had to several series of fractional distillations.

The first specimen examined had been obtained from a maker of great repute. Half a litre was distilled from a flask fitted with a long tube carrying a T-piece, the thermometric column being entirely immersed in the vapour.

The liquid commenced to distil at 77° C., and the following nine fractions were collected. A dark-coloured residue containing amyl alcohol and other substances remained in the flask.

I.	77°– 82°	= 30 c.c.
II.	82°– 88°	= 23 c.c.
III.	88°– 93°	= 140 c.c.
IV.	93°–100°	= 138 c.c.
V.	100°–105°	= 52 c.c.
VI.	105°–110°	= 24 c.c.
VII.	110°–120°	= 17 c.c.
VIII.	120°–125°	= 12 c.c.
IX.	125°–132°	= 20 c.c.

This process of fractional distillation was repeated five times with each of these nine portions. A considerable quantity of liquid was thus obtained between 67°-69°, and again between 94°-98°. These liquids were again distilled and the fractions collected at 67° and 96° respectively. The specific gravity of the liquid boiling at 67° was ascertained to be 0·8755 at 15° (water at 15°=1). The nitrite was estimated in the compound, and it was found to correspond almost exactly with that contained in iso-butyl nitrite (0·1756 gram of liquid yielded an amount of nitric oxide corresponding to ·1746 gram $C_4H_9NO_2$). The physical and chemical properties of the liquid were thus shown to be identical with those of pure iso-butyl nitrite (see p. 487). This compound constituted about 10 per cent. of the original "amyl nitrite." The liquid which boiled nearly constantly at 96° was next examined. Its specific gravity was 0·878 at 15° (water at 15°=1). The amount of nitrite contained in it was almost the same as that contained in amyl nitrite (0·211 gram yielded an amount of nitric oxide corresponding to 0·2099 gram of $C_5H_{11}NO_2$). This liquid was evidently a mixture of α-amyl nitrite (b.p. 97°) and β-amyl nitrite (b.p. 94° circa). The presence of the β-amyl nitrite was proved by the dextro-rotation exercised by the liquid. The quantity of the amyl nitrites contained in the original substance was about 50 per cent.

A specimen obtained from another well-known maker had evidently been prepared from very imperfectly rectified fusel oil, and in all probability by the action of nitric acid. When half a litre was fractionally distilled a liquid was obtained at 20° which after redistillation proved to be chiefly ethyl nitrite (b.p. 17°). Liquid distilled at all temperatures between 20°-55° and at 55°, 65 c.c., had been obtained. This fraction, when submitted to repeated distillation, yielded primary propyl nitrite.* Between 55°-70° 53 c.c. of liquid passed over, and after this had been many times fractionally redistilled iso-butyl nitrite (b.p. 67°) was obtained. Between 70°-80° 60 c.c. distilled and between 80°-90° 35 c.c. By distilling these fractions, together with residues from the distillation of lower fractions, a mixture of α-amyl nitrite and β-amyl nitrite boiling at 96° was isolated. It was shown by analysis to be almost pure (0·211 gram of liquid yielded an amount of nitric oxide equivalent to 0·2109 gram of $C_5H_{11}NO_2$). By continuing the fractional distillation about 50 per cent. of liquid was collected above 100°. In this liquid were recognized unaltered amyl and other homologous alcohols, valeric acid and amyl valerate, but it was not minutely examined. The total amount of the amyl nitrites obtained constituted less than 40 per cent. of the original liquid.

a rotation of − 0·9° in a column 200 mm. long. The specific gravity at 15° was 0·8135, and the boiling point 131·5° C.

* The physical and chemical properties of this nitrite will be described in a future paper.

Professor Cash has observed that pure iso-butyl nitrite acts more powerfully than the mixture which constitutes the official "amyl nitrite."

We wish to thank Miss L. E. Boole and Mr. Frank Browne for having confirmed, by an independent series of experiments, the results which are recorded in this paper.

COMPARATIVE EFFECTS OF SPIRITUS ÆTHERIS NITROSI AND SOLUTION OF NITRITE OF ETHYL.

BY D. J. LEECH, M.D., F.R.C.P.,

Professor of Materia Medica and Therapeutics in the Owens College, Manchester.

In the *Practitioner* for October, 1883, I pointed out that spiritus ætheris nitrosi answering to the tests in the British Pharmacopœia has a distinct influence on the circulation, and suggested that the therapeutic value of the drug was chiefly due to this effect, which is manifestly dependent on the nitrite of ethyl contained in the spirit. The question of the practical identity of the action of spirit of nitrous ether and solution of nitrite of ethyl has not yet been definitively settled, and as it is one which in recent years has specially interested pharmacists, I am glad to take this opportunity of setting forth here the conclusions I have arrived at.

Pharmacological considerations certainly render such identity probable. Of the various substances present in the spirit in addition to nitrite of ethyl and alcohol, aldehyde is perhaps the most abundant. But aldehyde has no properties which lead us to expect that it has any influence on the physiological action of the spirit. It does not appear to interfere with the circulation when given in quantities much larger than are contained in medicinal doses of spiritus ætheris nitrosi, for I have watched the effects of 20 minims on myself and others, and have failed to find the slightest change produced on the pulse. Large and even small doses sometimes irritate the stomach, and in considerable quantities it causes in animals a comatose condition and likewise arrests respiration, but there are no reasons for believing that the amount contained in spirit of nitrous ether ever gives rise to an appreciable physiological effect. Paraldehyde, too, which may be contained in spiritus ætheris nitrosi, though reducing pulse tension in doses of 50 minims and upwards, and acting as a sedative in smaller doses, is not present in sufficient quantity to materially influence the action of the spirit, nor is there reason for believing that any one of the other oxidation products can by itself produce a definite effect when taken in minute quantities.

But though no single constituent of spiritus ætheris nitrosi, apart from the alcohol and the ether, either adds to or alters its physiological or therapeutic action, yet these constituents combined might have a distinct effect. To determine whether this is so or not I have made some experiments as to the comparative influence of spiritus ætheris nitrosi, answering to the tests of the British Pharmacopæia, and a 2·25 to 2·7 per cent. solution of nitrite of ethyl in absolute alcohol containing 5 per cent. of glycerine, kindly supplied to me by Professor Dunstan, Director of the Research Laboratory of this Society. Both dilate the vessels and decrease tension, and both remove undue contraction of the muscular coats of the bronchial tubes, but neither the spirit nor the solution have any powerful and constant influence on the skin or kidneys. I have given them repeatedly in doses of a drachm to two drachms to healthy people without noting any increased action on the skin, but if the subject of experiment be kept in bed and somewhat more warmly covered than usual, one, or more frequently two doses of either not unfrequently produce perspiration. I have not, however, been able to discover any difference between the activity of the spirit and that of the solution, nor do they differ, as far as I can ascertain, in their action on the kidneys. At times, after both, a slight increase in the urine flow seems to occur, but more frequently no changes are observed.

It is more difficult to compare the therapeutic uses than the physiological effects of two preparations. Spirit of nitre has long been a popular remedy for causing the increase of the urine flow and perspiration, but chiefly in those ailments where such increase and occur naturally at a certain stage of the ailment, as, for example, in feverish colds. I believe it certainly does hasten a critical perspiration by increasing the blood flow through the skin, so, too, does the solution of ethyl nitrite, but I can find no ground for believing that one is more effectual than the other. As diuretics, both spirit and solution have seemed to me even less reliable than as diaphoretics, hence comparison is difficult, but so far I have been unable to detect any difference in the power of the two preparations.

In ailments connected with narrowing of the arterioles and in difficulty of breathing, due to contraction of the muscles of the small bronchial tubes, the spirit and the solution are of great, and I think of equal, value; they tend to prevent the advent of attacks of angina pectoris, and by dilating the arterioles, they relieve an overloaded heart. The popularity of spirit of nitre as a medicine depends, it seems to me, largely on this latter effect; even a very small dose of nitrite of ethyl will thus remove discomfort.

In difficulty of breathing, due to contraction of the smaller bronchial tubes, the administration of a drachm to a drachm and a half of spirit of proper strength often gives great relief; so, too, does solution containing an equivalent amount of nitrite of ethyl; but a spirit poor in nitrite will often fail to do any good. I found our hospital preparation ineffectual in such cases, and then ascertained that the percentage of ethyl nitrite, though doubtless sufficient at first, had fallen to ·3 per cent., the spirit having been in stock six months.

I need not allude in detail to the less important properties of the spirit and solution of nitrous ether. I have found no evidence that the two preparations differ at all in their therapeutic effects, provided the doses given contain an equivalent amount of nitrite of ethyl, and I am satisfied that a solution such as I have used will answer every medical purpose served by spiritus ætheris nitrosi.

The variations in the strength of the spirit used in time past has prevented due appreciation of one of its most useful properties, that of relieving certain forms of difficulty of breathing, and it is manifest that in order to get from nitrite of ethyl the results desired, it is essential that medical men should be supplied with a solution which can be always relied on to contain a known quantity. For another reason, too, it is most desirable that

they should be able to know exactly the amount of the ethyl compound contained in the preparation they give. Experience has shown that susceptibility to the nitrites differs greatly; symptoms such as throbbing headache and other troubles are in some produced even by small doses, whilst others can comparatively take large quantities without noticing any subjective symptoms. In giving nitrite of ethyl, the possibility of such variations has to be taken into account, and the dose has to be graduated to the patient as well as to his ailment, for a dose which proves curative in one case, will in another entirely fail to give relief, owing to difference in susceptibility. Such graduation is of course impossible, unless we are supplied with a preparation of fairly constant strength.

Fortunately nitrites, even when given in excessive amounts, hardly ever give rise to serious troubles, but the faintness and uncomfortable sensations I once experienced after a small quantity of a 25 per cent. solution would make me cautious about giving a dose which might be excessive in relation to the patient. I have seen too 90 minims of a spirit of full strength cause slight faintness, and it seems to me a solution of definite strength is necessary for the sake of safety when full doses are given.

The solution in alcohol and glycerine suggested by Professor Dunstan and Mr. Dymond last April seems very well adapted for the administration of nitrite of ethyl, and from occasional examinations made of the strength of specimens in use I can confirm Professor Dunstan's statement as to its stability. The large amount of alcohol which is required to administer such a dose as two minims of the nitrite seems to me its only drawback; but the combination of the nitrite and alcohol is in itself, I think, useful, and if alcohol be not desirable, a nitrite soluble in water may be given in place of the ethyl compound, since all nitrites have a similar influence.

I believe, then, that the introduction of a fairly stable solution of ethyl nitrite is now called for, and that the time-honoured spiritus ætheris nitrosi should disappear from the list of official remedies, since on account of its ready decomposition it is not adapted for administering the nitrite in definite doses. Should, however, there be any who find or think they find an advantage in the spirit, and both be included in the Pharmacopœia, it seems to me the present test of purity of the spirit would not be needed. For then the ethyl nitrite could hardly be considered the cause of this advantage, and this being so it would not be necessary to ask that it should contain a definite percentage of the nitrite. Certainly "sweet nitre" should not be required to contain as much as 2 to 3 per cent. of ethyl nitrite. I cannot help thinking that had it been easy to maintain so high a standard we should have heard of more evils arising from the popular use of this drug than we have done.

NOTE ON THE EFFECT OF AMYL NITRITE.

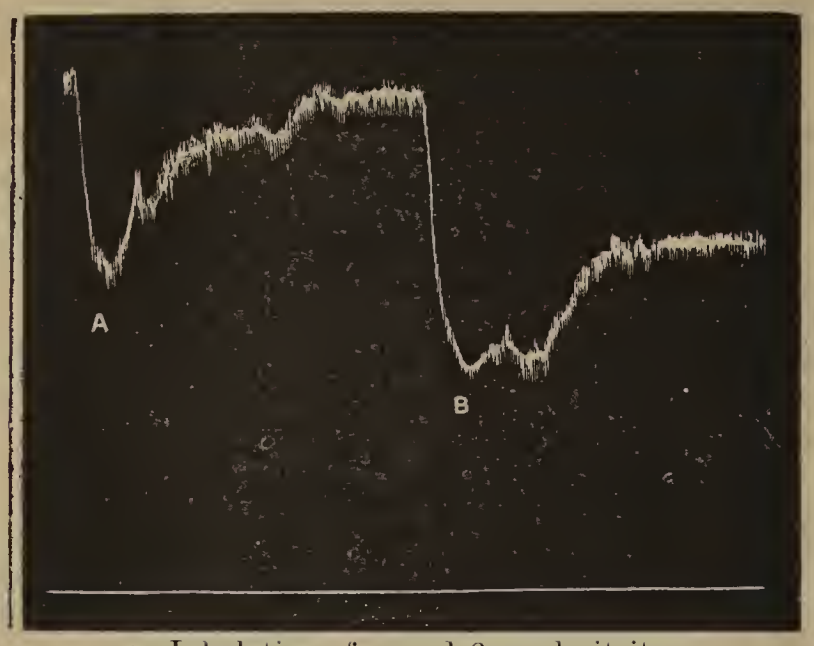
BY T. LAUDER BRUNTON, M.D., F.R.S., AND T. JESSOP BOKENHAM.

The composition of officinal nitrite of amyl and the action of its several constituents is a subject of great practical importance, inasmuch as the distressing pain of angina is relieved immediately and almost invariably by active specimens of the drug; but occasionally it appears to fail. These failures are sometimes, if not always, due to the fact that the drug supplied as nitrite of amyl contains only a small proportion of the active constituent, or none at all. A year or two ago one of us (Brunton) met with a specimen which had no effect whatever in causing the usual symptoms of flushing when he inhaled it, although he is peculiarly sensitive to the action of the nitrite. Such a specimen as this would of course have been absolutely useless in a case of angina pectoris, and the failure to relieve would have been charged against nitrite of amyl, although, as a matter of fact, the nitrite had not been used, but only some other substance falsely bearing its name. In a case mentioned by Dr. Balfour the pain of the anginal attacks was only relieved by nitrite of amyl which had been recently made, and specimens which were more than a few days old did not remove the pain. He was therefore obliged to get a manufacturing chemist to provide him with a constant supply of fresh nitrite. This fact seems to indicate that the most active constituent of officinal amyl nitrite is either very volatile or rapidly undergoes change. The probability of the preparation either losing its strength by volatilization of an active constituent, or by undergoing oxidation, is lessened by enclosing the newly made nitrite in glass capsules. Mr. Martindale has noticed that when the stopper is taken out of a bottle of newly made nitrite it causes flushing of the face much more readily than an older preparation, so that he loses no time in filling the capsules. In order to be certain of giving relief to sufferers from the agonizing pain of angina pectoris, it is of the utmost importance that we should know what the ingredient of commercial nitrite of amyl is which renders the newly made specimens so much more active than the older ones. That it is probably not either of the amyl nitrites is, we think, proved by the following experiment, which shows that the pure amyl nitrites have less effect in lowering the blood pressure, and are therefore less likely to afford relief in angina pectoris than the B.P. nitrite.

A cat was anæsthetized by chloroform and its blood pressure curve recorded. It was then made to inhale the vapour of a pure specimen of the amyl nitrites obtained from Professor Dunstan*, when the blood pressure at once commenced to fall, as seen on the chart. When the pressure ceased falling the vapour was discontinued, with the result that the blood pressure instantly began to rise, and almost reached its original height. The animal was then caused to inhale the vapour of a B.P. specimen of amyl nitrite†, and the chart shows a rapid and much greater fall in pressure, which remained low much longer than before, and the animal only partially recovered, its respiration also being profoundly affected, and at length altogether stopped. This result is striking and unexpected, but it is explained by Professors Dunstan and Cash's discovery of the facts that commercial amyl nitrite contains iso-butyl nitrite, and that this body is more active than amyl nitrite.

* This specimen contained about 84·6 per cent. of α-amyl nitrite and 15·4 per cent. of β-amyl nitrite.—W. R. D.

† This specimen was known to contain a considerable quantity of iso-butyl nitrite.—W. R. D.



A. Inhalation of α- and β-amyl nitrites.
B. Inhalation of "amyl nitris, B.P."

There are several diseases in which it is very desirable to relax the blood vessels and relieve the tension within them, but the kind of relaxation required is not the same in all. In angina pectoris we wish a drug which will relax spasm of the vessels very quickly, but as a rule we do not require the relaxation to be prolonged. On the other hand, in cases of Bright's disease, where there is a constant high tension within the blood vessels, or in cases of failing heart, where the enfeebled ventricle is barely able to overcome the elastic resistance of the arterial walls and force the blood onwards, we require a drug which will produce a prolonged dilation of the vessels, less in extent perhaps, and less rapid than we require in angina pectoris, but so prolonged that by continued administration of the remedy we may practically keep the tension in the blood vessels down to the point we desire and thus prevent the risk of rupture of the vessels and apoplexy on the one hand, or failure of the heart on the other. By farther investigations into the various organic nitrites or allied bodies we may hope ultimately to get exactly the remedies we want, and thus be certain of giving to our patients the relief they require.

NOTE ON THE FOREGOING PAPERS.

BY PROFESSOR DUNSTAN.

The investigation of the physiological action of these nitrites, so far as it has been carried at present, appears to point to an unexpected result. Previous researches on the physiological action of other homologous paraffinoid derivatives have led to the conclusion that the effects are in all probability functions of the molecular weights, and analogy might lead us to suppose that the physiological action of the nitrites which stand higher in the series would be more powerful than that of those which occupy a lower position, and consequently possess a smaller molecular weight. The preliminary experiments of Professor Cash, which relate to the effect exercised on the blood-pressure, pulse-rate, and respiration of small animals, seem however to point to the fact that iso-butyl nitrite is a more active substance, or at any rate is more prompt in its action, than a mixture of α-amyl and β-amyl nitrite. The probable correctness of this indication is strengthened by the results obtained by Dr. Lauder Brunton, who has noticed that the action on the human pulse-rate of a mixture of α-amyl and β-amyl nitrites is less marked than that occasioned by the official "amyl nitrite" containing much iso-butyl nitrite. Professor Cash has further observed that pure iso-butyl nitrite is more powerful than the official liquid which contains all three nitrites.

It seems certain that the presence in the liquid of the British Pharmacopœia of various constituents other than nitrites, is quite unnecessary; indeed, these substances must undesirably complicate the peculiar physiological action of the nitrites on which the remedial action is known to be dependent.

As soon as it has been conclusively shown which of these nitrites is best adapted for therapeutical use, it will no doubt be possible to devise a method for its preparation in the pure state which can readily be employed by the pharmacist.

The experiments of Professor Leech appear to leave no room for doubt as to the desirability of employing in therapeutics a pure solution of ethyl nitrite instead of the impure spirit of nitrous ether.

CULTIVATION OF SESAMUM AND GROUND-NUTS IN CHINA.

Sesamum is best grown on high dry ground, and is most in danger from excess of moisture; it does not require watering, and dew alone is sufficient moisture to nourish it. In making beds, therefore, the centres should be higher than the sides, so as to allow the water to run off. In the first month of every year it is sown broadcast, not in lines, and whether thickly or sparsely is immaterial. In about ten days it puts forth shoots, in two months and a half it blooms, and in another two months and a half it is fit for harvesting. At harvest time the latest seeds are not yet ripe, but the harvest cannot wait, or the other pods would fall off, and the seeds drop out on the ground. The plants, root and all, are carefully taken out of the ground, put on a cement floor, and threshed with a flail. There are two kinds, black and white. Sesamum does not require manure generally, but in the worst soil ashes and ox manure may be used. About 27 ounces sown to an acre yield about 550 lbs.

Ground-nuts are best grown in a soil of coarse sand and mud. They should be set deep, and the ground pressed down firmly over them. The ground is ploughed about April, and trenches dug about 10 inches apart, into which ashes, lime, and rubbish are thrown. The seeds are sown 10 inches apart, and as each is put in the sides of the trench are turned over it with the foot and stamped down firm. Every ten days or so the ground is weeded, and in about two months the sprouts are sufficiently long, and are sprinkled with liquid manure. In four months they come into flower; the flower-stalk then bends over, and, as the flower falls off, the flower-stalk buries itself in the ground, and produces seeds, ground nuts, which become ripe about the Shuang-chiang festival (October 23). When the harvest, however, takes place after this date more oil can be got, and a better price obtained for it. Ground-nuts are harvested by ploughing them up with an ox-plough, when the stalks and seeds clinging to the plough are gathered into a heap. For the remainder which are still left in the ground two men sift the earth with a large bamboo sieve. The pods are dried perfectly dry in the sun, until the thin skin which covers the seed can be broken by rubbing, when they can be stored If they are not quite dry they shoot again, and are useless. Oil is pressed from ground-nuts, and the refuse made into ground-nut cakes; 40 lbs. sown to an acre yield about 666 lbs.—*Consular Report.*

The Pharmaceutical Journal.

SATURDAY, DECEMBER 22, 1888.

Communications for the Editorial department f the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary, 17, Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PHARMACY IN BRAZIL.

A RECENT number of the *Pharmaceutische Zeitung* contains a communication from a correspondent resident in Santos, giving some interesting information respecting the conditions affecting the practice of pharmacy in Brazil. The writer says that Brazil is not to be reckoned among the new countries in which the pharmacist can readily attain to independence. The law provides that any person who wishes to open or carry on a pharmacy must first pass the examination prescribed by the Government, and this law is stringently maintained in respect to foreigners; but for the native Brazilian it has many loopholes through which he can slip, enabling him to put in an appearance as a pharmacist without even having undergone the State examination, and possibly he may scarcely possess elementary school knowledge. The training of a Brazilian youth who wishes to devote himself to legitimate pharmacy, however, commences by his going at once to the university. A previous practical training is not considered necessary, as he is supposed to work in the laboratory at the university.

There exist in the empire three faculties for pharmacists, at Rio de Janeiro, Ouro Preto and Bahia. The time of study extends over three years, divided as follows:—

1st year: Physics, Inorganic Chemistry, Mineralogy and Zoology.

2nd year: Botany and Inorganic Chemistry.

3rd year: Practical Pharmacy, Therapeutics and Toxicology.

The student is at liberty to present himself for examination in any of these subjects as he may please, and after passing in it once he is not required to take it up again in a subsequent examination; so that when he has the good fortune to come to the end of his trial, there is no evidence that he retains any knowledge except of his last subject. Notwithstanding the comparatively prolonged period of study it is alleged that the scientific training of the usually very young pharmaceutical student is only superficial; or at any rate, that it is not suitable to serve as an adequate basis for his subsequent vocation. Much of this superficiality is attributed to the existence of a regulation according to which the professors are required to supply the candidates, fourteen days before the day of examination, with a list of the questions that they intend putting to them.

The pharmacist who has been trained and examined in Europe is excluded from these favours; for him there is prescribed a so-called "free examination," in which he has to submit himself to examination by the professors in every subject. Until about five years ago these examinations were conducted in the French language, but now only Portuguese is allowed. The examination lasts about a month, but at least two months are required for that and the preliminaries. The examination is not a very severe one, but some of the questions are more closely associated with the practice of medicine than that of pharmacy. After passing, the successful candidate is at liberty to commence business in any part of Brazil, but he is not permitted to own more than one pharmacy. As to competition, the number of pharmacists in a district is usually relatively large; but, on the other hand, the consumption of medicine, as a consequence of climatic conditions, is very considerable, and French and English "patents" are in very great favour. In addition, the prices obtained are fairly good, though, as there is no official standard, this is to some extent controlled by competition. There is no native pharmacopœia, the French Codex being freely used, but it is required that all prescriptions be written in Portuguese, and an assistant would stand a very poor chance of obtaining an engagement in a native pharmacy if he were not familiar with that language. It would appear therefore from this account that the attractions presented by Brazil to the British pharmacist desiring to try his fortune in another country are not overpowering, unless an engagement were first obtained in a pharmacy of European origin.

ALUM IN BREAD-MAKING.

A VERY interesting investigation of the effects produced by the use of alum in bread making has lately been undertaken by Professor J. W. MALLET of the University of Virginia. It has long been a general opinion that the addition of alum was injurious, and that its use even in small quantities to improve the appearance of bread was to be regarded as reprehensible. On the other hand it has been asserted that the decomposition of the alum is so complete as to leave only alumina in an insoluble form that is inert and harmless in the stomach and alimentary canal. But the discussion of this subject has hitherto been conducted more on the basis of assumption than of

actual experimental data, and hence Professor MALLET's inquiry is calculated to be of service in affording opportunity for more rational conclusions. In the United States of America it appears that cheap baking powders made with alum and bicarbonate of soda are in common use, and it is that circumstance chiefly which has led to the investigation of the subject. The main points which appear to have been established are that the greater part of the baking powders in the American market are made with alum, the acid phosphate of calcium, bicarbonate of soda and starch. These powders give off very varying proportions of carbonic acid gas, and therefore different proportions have to be used for the same quantity of flour to produce the requisite porosity in bread. When moistened with water they yield small quantities of aluminium and calcium salts in a soluble form. Most of them leave after use the greater part of their alumina in the form of phosphate, but when acid phosphate of calcium is not used alumina is left. As the baking temperature in the interior of bread does not exceed 212° F., neither the water of combination of alumina or of its phosphate is removed from the residues of baking powder so used. However, in doses not very greatly exceeding such quantities as may be derived from bread as commonly used, Professor MALLET has found that hydrate and phosphate of alumina produced an inhibitory effect upon gastric digestion. He considers that this effect is probably a consequence of the union of alumina with the acid of the gastric juice and at the same time of the precipitation of the organic peptic ferment in an insoluble condition like a kind of lake. A similar action may also be exerted by hydrate of alumina upon some of the organic matters of food. From the general nature of the results obtained, it is inferred that not only alum itself is injurious, but that likewise the residues resulting from its use in bread making must be ranked as objectionable, and that the practice of adding alum should be studiously avoided when the object aimed at is to make wholesome bread.

An Evening Meeting of the Pharmaceutical Society will be held in Edinburgh, at 36, York Place, on Wednesday, December 26, when a paper will be read on "Cow's Milk; a probable source of danger," by Mr. A. Gibson; and one on "Recent Additions to the Museum," by the Assistant Secretary. The chair will be taken at half-past eight o'clock.

* * *

The Examinations at 17, Bloomsbury Square, were on Thursday attended on behalf of the Privy Council by Dr. Thomas Stevenson, Lecturer on Chemistry and Medical Jurisprudence at Guy's Hospital and Official Analyst to the Home Office, who, we understand, has accepted the office of Visitor to the examinations under the Pharmacy Act conducted by the Pharmaceutical Society in London which was rendered vacant by the death of the late Dr. Greenhow.

* * *

In reply to a question asked in the House of Commons by Mr. Picton on Friday the 14th inst., as to the number of cases of poisoning by carbolic acid, and the intentions of the Government in respect to the resolution of the Council of the Pharmaceutical Society that carbolic acid ought to be included among the poisons coming within the purview of the Pharmacy Act, Mr. Stuart-Wortley said that the resolution passed by the Pharmaceutical Society had been submitted to the Privy Council Office for approval and was still under consideration, but that there were difficulties in the way of approving the resolution, since skilled opinion was not altogether favourable to the views expressed by the Society, and the question was one that required great consideration.

* * *

Last Wednesday a number of the former students of Professor Williamson at University College met to present a portrait of the Professor to the College on the occasion of his retirement from the chair of chemistry which he has occupied for many years as the successor of Thomas Graham. The presentation was made by Sir Henry Roscoe, and acknowledged by the President of the College, Mr. John Erichsen, who occupied the chair. At a later period Professor Williamson was entertained at dinner by many of his pupils and friends at the Freemason's Tavern.

* * *

We have received from Messrs. Thomas Christy and Co. a copy of a letter from Messrs. Lloyd Bros. of Cincinnati, in which they reply to certain complaints that have been made as to the want of uniformity in the colour of commercial euonymin, to the effect that in their opinion that character is not to be relied upon as an index of the quality of the article, but that it is merely an accidental circumstance resulting from the variable amounts of root bark and tree bark in the material operated upon. Having for many years deemed this variation of colour unimportant, Messrs. Lloyd say that they have always made brown euonymin without regard to this difference, and they consider that the quality of the light coloured variety will be found exactly like that of the darker coloured. It is interesting in connection with the recent references to this subject to learn from experienced manufacturers what is their opinion of an external characteristic that has, we believe, been relied upon as a sign of quality.

* * *

A serious outbreak of fire occurred on Sunday morning last at the recently reconstructed Heriot-Watt College, Edinburgh, which resulted in the destruction of the chemical laboratory and its contents. Considerable uncertainty prevails as to the origin of the fire; but one explanation thought probable is that it was caused by an electric-light wire, from which the insulating material had been melted by the heat of a neighbouring flue-pipe, igniting the surrounding woodwork.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN LONDON.

Thursday, December 13, 1888.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

An Evening Meeting of the Pharmaceutical Society was held on Thursday, the 13th inst., at 17, Bloomsbury Square, the chair being taken by Mr. Michael Carteighe, President, at 8 o'clock.

CONTRIBUTIONS TO THE CHEMISTRY AND PHARMACOLOGY OF THE NITRITES OF THE PARAFFIN SERIES:—

At the request of the President, Professor Dunstan gave a *résumé* of the following four communications from the Research Laboratory:—

I. INTRODUCTORY. BY PROFESSOR DUNSTAN. (Page 485.)

II. ON ISO-BUTYL NITRITE. BY PROFESSOR DUNSTAN AND E. J. WOOLLEY. (Page 487.)

III. ON THE METAMERIC AMYL NITRITES. BY PROFESSOR DUNSTAN AND W. LLOYD WILLIAMS. (Page 487.)

IV. THE CHEMICAL CONSTITUENTS OF OFFICIAL AMYL NITRITE USED IN MEDICINE. BY PROFESSOR DUNSTAN AND E. J. WOOLLEY. (Page 490.)

The following papers were also read:—

COMPARATIVE EFFECTS OF SPIRIT OF NITROUS ETHER AND SOLUTION OF ETHYL NITRITE. BY PROFESSOR LEECH, M.D., F.R.C.P. (Page 490.)

NOTE ON THE EFFECT OF AMYL NITRITE. BY DR. LAUDER BRUNTON AND T. J. BOKENHAM. (Page 491.)

These papers gave rise to the following discussion:—

Dr. LAUDER BRUNTON said that after discovering the utility of nitrite of amyl many years ago, he went to work with Professor Ludwig in his laboratory at Leipsic, and there made further researches. He regretted to say, however, that he had been somewhat in the position of Solomon's sluggard, who would not roast his game after he brought it home. He took the trouble to make a great number of experiments but he had not published them, and he had kept them to himself ever since 1869, always thinking that he would have something more to add to perfect them, and he had never got them out until now. At that time he made some experiments with nitrite of ethyl and with nitrite of sodium, and found that both those nitrites lowered the blood pressure. He thus satisfied himself that the action upon the blood pressure was not due to the amyl, but was due to the salt employed being a nitrite. Some years later, in 1876, he asked Mr. Gresswell to engage with him in researches upon the action of various nitrites, and they tested the effect of the nitrite of ethyl, the nitrite of propyl and the nitrite of capryl in comparison with the action of nitrite of amyl. The results had only been mentioned in the Bartholomew's Hospital Reports, and had not been published in any other way. They found that the nitrite of amyl appeared to differ from the other nitrites in possessing a very much more active power to dilate the vessels and to lower the blood pressure. The other nitrites, however, seemed to possess the same effect, with, curiously enough, the exception of the nitrite of capryl, which as far as the experiments went did not seem to cause any effect on the blood pressure, although it caused great distress to the animal and interfered with the respiration. It might be that this interference with respiration counteracted the action of the nitrite, because nothing would raise the blood pressure so much as suffocation, and it was quite possible that the suffocative effect of the nitrite raised the blood pressure so much as to counteract the lowering effect of the nitrite. That, however, was a point they could not pronounce upon with certainty, for all those experiments were open to the objection that the substances with which they experimented were not chemically pure. Although the substance used was labelled nitrite of capryl, and was obtained from a good manufacturer, they could not be sure that it was really what it purported to be. They were not exactly to be blamed for that, because the laboratories in this country were very different from those in Strassburg, where the Pharmacological Institute alone was as big as the whole of St. Bartholomew's, and where there was one department engaged entirely in the chemical analysis and investigation of the drugs to make sure that the substances were pure, and another department engaged in the microscopical examination. By that means the researches were carried on with greater certainty and more successful results. That was because the Institution had the assistance of the State. He might mention one instance to show the high value which was there placed by the authorities on these scientific institutions. It was found desirable to build an institute at a certain place, but a difficulty arose owing to the fortifications being in the way. It was said that they could not have the building erected because of a bastion, but when the matter came before the authorities, they said, "Let the bastion go elsewhere," and the bastion went elsewhere. That might be a little apart from the subject, but it showed the great importance which the German Government attached to scientific researches. He wished to point out that the nitrite of amyl so-called, as purchased in the shops, varied in the effects it produced to a very considerable extent. The pure nitrite of amyl did not produce such a marked action as the commercial specimen, but in all probability the explanation of that was given by Professor Cash, who found that butyl nitrite was the more powerful of the two, and probably the commercial article contained a large percentage of that.

The PRESIDENT said the subject of these notes was one which of course concerned equally the pharmacist and the physiologist and therapeutist. He took it that the object that therapeutists and physiologists had in this country was to do what they could with the assistance of those who took up one special department of pharmaceutical work to compete with the State-aided bodies in Germany and elsewhere. It seemed to him that one of the objects of a Research Laboratory such as a society like the Pharmaceutical Society could afford, was to do what had been done that night. Of course they were not aided by the State, and the Society was not a rich body, and it was well-known that pharmacists themselves were not rich people, but they were alive to the great importance of systematic research carried on by a corporate body, with the assistance of experts both in the physiological and therapeutical world. It was obvious to those who had any interest in organic chemistry and followed its work, that the therapeutist and the physiologist were absolutely at the mercy of the chemist whoever he might be, and he thought the Research Committee had done wisely, with the collaboration of Professor Dunstan, in instituting a research in the direction of these communications. He thought the Society was to be congratulated on the fact that besides the professors who had given their experience they had present some eminent physiologists, and he should be glad if they would tell them whether the Research Committee was travelling on right lines or not, for the Council of the Society and those in authority were anxious, as far as possible, to be guided by those who would point out to them the best direction in which their efforts might be used.

Dr. BURDON SANDERSON said he had nothing to tell the meeting on the subject of the nitrites, excepting that he had happened to have taken an interest in that particular investigation for a good many years. The action of the nitrite of amyl first became known in consequence of Dr. Brunton's investigations in Edinburgh, and then his physiological researches in Leipsic; and it so happened that he (Dr. Sanderson) was the first person in London to introduce those experiments to the Clinical Society in 1868, at which time the subject was entirely new. At that time he made a number of experiments himself, and afterwards made observations on patients. He remembered one who suffered dreadfully from what was commonly known as angina pectoris, and who was signally relieved for a succession of years by the administration of the amyl nitrite. The main general interest which the communications before them had was that they illustrated so strikingly the importance of co-operation between chemists on the one hand and the medical profession and physiologists on the other. There was no doubt that, as a remedy amyl nitrite had somewhat fallen into disuse. It had been found that the use of it was not so certain as was at first hoped, and could not be so constantly depended upon in asthma and in angina pectoris; and the facts brought before them that night explained the reason of this failure. They were dealing with a substance which contained several bodies which were chemically different from one another, and which varied very much as regards their physiological activity. The example that had been given in the Research Laboratory of the bringing together of chemical work with pharmacological work strikingly illustrated the advantages of co-operation. One might regard it as a fortunate incident that Professor Dunstan, having completed his side of the investigation, was able to call in the aid of such men as Professor Cash, Dr. Brunton and Professor Leech, but that very good luck which had occurred made one regret more and more that there was in this country no organization, similar to the organization which had already been brought into existence by the Pharmaceutical Society, for the carrying on of the other side of the investigations. The Pharmaceutical Society had organized a Research Laboratory, but no research laboratory had been organized by the medical profession, or by any of the bodies which represent the medical profession. They might hope that the two great colleges would shortly bring into existence a research laboratory for the other side of the investigation which would be able to co-operate with that Institution. Then if the Pharmaceutical Society, as representing pharmacy, and the two great colleges as representing medicine and surgery, worked together, shoulder to shoulder, they most certainly would see great results brought about. There would then be a prospect of combination brighter than any which had existed before. They might hope that we in England would be able to show that the voluntary principle, which in this country had accomplished such wonderful results in other departments, would be equally successful in the promotion of the application of science to the relief of disease and suffering. He hoped that at all events the younger of them might look forward to see this prospect realized.

Professor MICHAEL FOSTER regretted very much that, being detained elsewhere, he had lost the first part of Professor Dunstan's valuable communication, and any observations he might make would only be very general. It was perhaps unnecessary, but he could not help adding his voice as a warning against any too strong attachment to State-aided research. The English were a free people. The Germans were very successful in scientific research, but they were not a free people; and he took that it in the long run, the English with their freedom would beat them, if Societies like the Pharmaceutical Society were willing to put their hands into their pocket. The Chairman had said it was a very shallow pocket, and he would say, may it yearly be a deeper one. He trusted they would have the sinews of war to carry on such investigations. He was exceedingly interested in Professor Dunstan's results with regard to the impurities—the "uncleanliness"—of reputable drugs. Physiologists went on making experiments, and publishing this and that result, and all the while they were working with impure material. They knew what the effect was of introducing an inappreciable quantity of one metal into a mass of another, and yet the introduction into the living organism of even a slight impurity might have an infinitely greater effect. It was important that physiologists in all their work should deal with clean materials, and here a great opening was before the Society, to determine what articles were pure and what impure that came before them. In regard to physiological experiments they could get their instruments verified, and they could ascertain approximately whether their thermometers gave correct readings or not, but none of them knew whether their drugs were pure or not. If they could be sure of that a great deal of error would be prevented. He would next remind them that everyone who took up a physiological investigation of the action of a drug should be prepared at any moment to leave the drug on one side and follow the leading phenomena which the action of the drug had brought before him. Of course the Society could not spend the money out of its slender purse in promoting the general progress of physiology, but it should be prepared, when a person had taken up a physiological research by means of their research fund, to hear him say, "I will have nothing more to do with this drug, I am going to investigate something else," and to give him its blessing and let him go on his way. Some years ago the substance pilocarpine was first introduced and he asked one of his young friends to investigate it, but the research took his friend far away from the drug on to the phenomena of the salivary gland, and then on to the stomach, and then on to the liver. He did not know whether they had any general instructions—they were generally useless—but he would say, do not attempt to describe the action of this or that drug in the general physiological language of the day. He observed that Dr. Cash spoke of paralysis. He should be inclined to send back an account of the physiological action of a drug which used the word paralysis. Paralysis was merely a general term. What they wanted to know was: what was the actual thing done in the economy which produced the loss of power, which in medical language is called paralysis. Let them not be afraid of inventing new terms, because they were sure to come upon new phenomena. He felt sure that this very admirable effort of the Pharmaceutical Society would result in a very great increase, not only in pharmacological and pharmaceutical knowledge, but in physiological knowledge, and if the Society's purse increased sufficiently and the investigators went on, they would soon catch the Germans up.

Professor ARMSTRONG thought the step which had been taken by the Society was one of such importance that all true friends of science were bound to wish it success. He quite endorsed what Professor Foster had said as to the necessity of leaving the professors free to work in any direction that they might wish. That was the only way in which research could be successfully carried out by anyone. No man could do that kind of work successfully, unless his whole heart was in it. He had been struck when present at the prize meetings with the profuse liberality with which masses of silver and bronze medals were given, and he had sometimes doubted whether this course was altogether so kindly as it might appear to

be, and whether it might not lead on some of the young men to think that they had accomplished more than they had accomplished. It seeemed to him that that was one of the directions in which by wise economy they might lengthen their purse with great advantage to the Society. So far as the school was concerned, the work that had been put before them that evening was likely to have a much more important influence on the students than any prize they might give them. If work of that kind was going on in a building, all who were worth consideration were bound to be affected by it. The example set in one corner of the building was bound to permeate the whole building. He joined with Professor Foster in congratulating the Pharmaceutical Society very heartily upon the public performance of the Research Laboratory that evening.

The PRESIDENT, in moving a vote of thanks to the authors of the papers, said to himself personally and to the other members of the Research Committee it was a source of great gratification that they were so well supported. He had especially to thank Professor Leech for being good enough to come from Manchester; and he thought when Professor Burdon Sanderson came from Oxford and Professor Foster from Cambridge to look in and see what they were doing, they might feel sure that they were going on pretty straight and well. Dr. Lauder Brunton had recently become one of the Society's honorary members, and coincident with that election the other members had had more frequent opportunity of making his personal acquaintance, and he thanked him specially on behalf of the Society in coming forward with his assistance.

The vote of thanks was put and carried by acclamation.

DONATIONS TO THE MUSEUM.

Mr. Holmes then called attention to a series of specimens of rare British plants for the Herbarium, some of which had been presented by former or present students of the Society. There was also a specimen of the oil expressed from lycopodium, which was chiefly remarkable from the fact that at 15° below zero it still remains fluid. He thought that its remaining liquid at such a low temperature should render it of some practical value. The specimens of alkaloids on the table were formerly exhibited in the Italian Exhibition, and were presented to the Society by the Fabbrica Lombarda di Prodotti Chimici, at Milan, through their London agent, Mr. B. Kuhn. There were also a few specimens of roots, which Mr. Christy had presented, which were used by the natives of the West Coast of Africa. The specimen of saffron on the table, which was recently met with in commerce, contained about 70 per cent. of the marigold florets. It had been examined in the laboratory, at his request, by Mr. L. Ough, to ascertain the nature of the colouring matter employed to dye the marigold florets, with the result that he found the colouring matter soluble in ether, which that of saffron is not, and that the saffron contained 10 per cent. of sulphate of barium.

There was also on the table, exhibited by Mr. Christy, an apparatus constructed by M. Galante for the application of chloride of methyl as a refrigerating agent. It consists of a small india rubber covered metal cylinder, which is filled with chloride of methyl under pressure. At one end of the cylinder is a small aperture, through which upon being opened the chloride of methyl escapes in a fine spray.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fourth meeting of the eleventh session was held in the Pharmaceutical Society's House, 36, York Place, on the evening of Wednesday, December 12, at 9.15. Mr. George Coull, President, in the chair.

The minutes of last meeting having been read and approved, the Chairman called upon Mr. Dougall to read the following paper on—

ACIDUM SULPHUROSUM, B. P.

BY W. R. B. DOUGALL.

In the British Pharmacopœia of 1885 acidum sulphurosum has been reduced very considerably in strength. The Pharmacopœia of 1867 ordered an acid containing 9·2 per cent. of sulphurous anhydride (SO_2), equivalent to 11·7 per cent. of real sulphurous acid (H_2SO_3). It was almost impossible for the retail chemist to prepare an acid of this strength, using the official proportions of sulphuric acid and charcoal.

In a paper read by Mr. Umney before the Pharmaceutical Society in February, 1869, the author gave the results of a number of experiments he had made, to determine if the acid could be prepared up to the full B.P. strength. He found that this could not be done, except by a troublesome process involving pressure and reduced temperature. He therefore recommended that the standard should be fixed at 5 per cent. SO_2, equal to 6·4 per cent. H_2SO_3, and this recommendation has been adopted in the present Pharmacopœia. This is still stronger than the acid official in the United States Pharmacopœia, which contains 3·5 per cent. SO_2.

Having come across several samples of the acid which seemed to vary considerably in strength, I examined a few commercial samples in order to see if, after the large reduction made in the official strength of the acid, they contained the 5 per cent. of sulphurous anhydride. The sulphurous anhydride was estimated volumetrically with iodine and starch as indicator; the sulphuric acid was estimated gravimetrically as barium sulphate. The following are the mean results of four estimations of eleven samples:—

	Density.	Percentage of SO_2	Percentage of H_2SO_4
B.P. standard .	1·025	5	trace
Sample A . .	1·020	4·41	0·5
„ B . .	1·023	1·27	2·0
„ C . .	1·020	0·	2·4
„ D . .	1·021	1·61	2·4
„ E . .	1·025	5	trace
„ F . .	1·017	0·55	1·4
„ G . .	1·022	0·28	3·2
„ H . .	1·024	5	trace
„ I . .	1·021	4·75	1·0
„ K . .	1·018	1·18	2·2
„ L . .	1·020	3·54	1·1

The Pharmacopœia allows the presence of a trace of sulphuric acid, but Martindale says that if when used for throat affections the sulphurous acid contains more than a trace of sulphuric acid it is very objectionable. You will notice a curious discrepancy in the density of one of the samples. Sample E contains 5 per cent. SO_2, and a trace of sulphuric acid, and has a density of 1·025, while sample I, containing 4·75 per cent. SO_2 and 1 per cent. of sulphuric acid, has a density only of 1·020. Alcohol absorbs about three hundred times more sulphurous anhydride than water, and forms a more stable solution. It was suggested to me that possibly a small percentage of alcohol might have been added to sample I, and of course this would reduce the density. Unfortunately I had thrown out my samples, and was unable to ascertain whether this was the case or not. In Martindale's 'Extra Pharmacopœia' the density is given as 1·027. This is higher than the official density, which corresponds with the results I obtained.

If it is not out of place here I should like to express my surprise at the extraordinary variations I met with in the price of so simple an article. One sample was

charged 1*d.* per ounce, another 1½*d.*, another 2*d.*, another 3*d.*, and another, the worst sample of all, 4*d.* I think a little more uniformity even in prices would not be hurtful, but would act beneficially.

To return to my subject, the acid is rather difficult to keep owing to its liability to oxidation to sulphuric acid by absorption of oxygen from the atmosphere. A writer in the *Pharmaceutical Journal* suggests that the bottle containing it should be inverted and placed in a vessel of water. A sample which has gone wrong may be restored by adding barium sulphite and allowing the insoluble barium sulphate to settle out. But perhaps the best plan when the acid becomes oxidized is to throw it out. It is a very cheap article and can be easily prepared fresh in a very short time. It ought to be kept in bottles quite full, as a small quantity kept in a large bottle, of course, oxidizes much more rapidly. The demand for sulphurous acid is not now nearly so great as it was a number of years ago, and that being so I think the pharmacist should see that his acid is of the proper strength, or not much under it, and this can easily be done by following the Pharmacopœial directions.

The reading of the paper was followed by a discussion taken part in by Messrs. Coull, Hill, Lunan, Macpherson and Taylor and a vote of thanks was unanimously awarded to the author.

The next business was a communication by Mr. Merson, but Mr. Hill explained that owing to other engagements Mr. Merson had been unable to complete his investigation, but hoped to bring it forward at a future meeting.

The Chairman then called upon Mr. J. Rutherford Hill, who made a few remarks entitled, "Some Suggestions." His first suggestion was that students should seek education for its own sake, and aim at more than was required for merely passing the examinations. He strongly deprecated on the part of students the premature raising of the question "*Cui bono?*" He did not think a student was in a position to give a satisfactory answer to such a question. The value of the knowledge acquired would only become apparent in after years. He had frequently observed that the men who while students sought diligently the attainment of knowledge, without too narrowly seeking to estimate its immediate value, were the men who rose in their profession and ultimately attained a leading position, while those who decried education and regarded much learning as worthless were very frequently the first to go to the wall. The struggle for existence was more and more taking the form of a competition of intellect, as distinguished from the competition of physical force of former times, and there could not be the slightest doubt that, other things being equal, the man who possessed a trained intellect and a mind well stored with knowledge had the best chance of succeeding. He then gave several instances, showing how seriously some pharmacists were hindered, and how egregiously incompetent they sometimes showed themselves to be, because they had neglected to acquire that fuller knowledge of their profession which would have enabled them to turn such opportunities to good account.

The second suggestion was originated by observing a tendency among chemists to strike out into new lines, a state of things doubtless prompted by the keen competition which at present existed. He thought it was well worth considering whether chemists might not, to a far larger extent, turn to profitable account their knowledge of the exact sciences. He thought chemists generally might very well undertake analysis and develope a profitable trade in chemicals and apparatus for photographic, microscopic, and general scientific purposes, and he quoted instances to show that this had been done in several cases with considerable success. He had often wondered why it was that all work of this kind was not in the hands of pharmacists. The reason, perhaps, was that to do so successfully it was necessary to go a little deeper into scientific study than was actually required for merely passing the Minor examination, as the majority seemed contented to do.

This brought Mr. Hill to his last suggestion, which he put in the form of a question. "Why should not every Minor man pass the Major examination?" Again he would probably be met with the old question, "*Cui bono?*" To that he would reply that he had never yet met a man who had passed the Major examination who thought he had done a wrong or useless thing. On the contrary, he had found them perfectly unanimous in the opinion that they had acted wisely in doing so, and that the result had perfectly justified their action. Even as a mere intellectual training he thought it was a most excellent thing for any man to devote a year or two to the task of attaining the highest rank in pharmacy. He strongly advocated the plan of going straight forward from the Minor examination. To lose time between the two only increased the difficulty, and moreover, new interests and new attractions soon began to claim attention and to halt between the two examinations was often to let the fitting opportunity pass by for ever.

An interesting and animated discussion followed, and was taken part in by Messrs. Bowie, Butchart, Coull, Henry, Lunan, Macleod and Taylor. A vote of thanks was awarded to Mr. Hill.

At the close of the meeting, several interesting microscopic slides were shown, including "rust" of wheat (*Puccinia graminis*), and the fructification of ergot (*Claviceps purpurea*).

MANCHESTER PHARMACEUTICAL ASSOCIATION.

A meeting of the above Association was held at the Victoria Hotel, on Wednesday evening, December 12. Mr. W. Wilkinson, Vice-President, in the chair.

A paper was read entitled a—

Note on Ergotin.

BY J. C. HUSBAND, F.C.S.,
Pharmaceutical Chemist.

In selecting a subject for discussion here to-night, this one of ergotin seemed to me to be the most suitable, inasmuch as I had recently examined several samples of different makers, and obtained, as I expected, results of an unsatisfactory nature.

Before its introduction into the British Pharmacopœia in 1885, ergotin had already been extensively used in medicine, its high state of concentration being especially suitable for pills as well as for hypodermic injection, but, not having the official status of a B. P. preparation, and the B.P.C. Formulary Committee being not yet born, no recognized mode of making it was in existence. It was frequently called "Extractum Ergotæ Aquosum Purificatum," and as there were in the German, French and U. S. Pharmacopœias extracts with similar names and of similar constitutions, English makers would probably follow one of these authorities, or the original of Bonjean himself.

These authorities, however, do not coincide exactly, so that before its official introduction to England, ergotin of different makers would be likely to show different compositions.

Before speaking however about this preparation, let us first recall the constituents of ergot itself. We are told that it contains sclerotic acid, scleromucin, sclererythrin, scleroiodin, scleroxanthin, ecbolin, ergotic acid, ergotinine and some others, and we may

be fully justified in accepting the statement. We will, however, not consider these principles separately, or which is the really effective one, or whether there be any one principle representing the full activity of the drug. We will again rest on authority, and authority says that the active principles are those which are obtained by treatment with water only, so that it will be sufficient for our purpose to divide these constituents into two classes, viz., those which are soluble in water and those which are insoluble in water. Again, as ergotin is obtained by exhausting ergot with water, those principles insoluble in that menstruum will be left in the marc; we may therefore give them no further notice.

But of those substances soluble in water, some are insoluble in a mixture of spirit and water, and as these latter are useless, and indeed detrimental to the action of ergotin, the British Pharmacopœia orders them to be eliminated. I have been speaking as if ergotin were prepared directly from the mother drug, whereas the B.P. requires it to be made from the fluid extract; this, however, makes very little difference, as the fluid extract is obtained by aqueous exhaustion.

A minute ago I said that the inert matters of the aqueous exhaustion of ergot were insoluble in a "mixture of spirit and water," but this mixture of spirit and water is a very indefinite term, conveying no distinct idea to the mind. I did, however, use this term advisedly, because it is to this point I wish specially to draw your attention. I will put it another way. We are making ergotin, B.P. We take of the fluid extract of ergot 4 fluid ounces; we evaporate this by a waterbath to a syrupy consistence. This also is an indefinite term. To this syrupy consistence we add 4 fluid ounces of rectified spirit, and when we do that we have a "mixture of spirit and water," and it depends upon the syrupyness of this syrupy consistence as to whether the mixture of spirit and water will be sufficiently strong in alcohol to precipitate the phosphatic and other salts and the scleromucin. The amount of gummy matter soluble in strong spirit is very small. By decreasing the strength of the spirit the solubility of the gummy matter is increased, so that if we have a syrupy consistence of a thinnish nature our product of ergotin will be large by the non-precipitation of the scleromucin; conversely, if our syrupy consistence be of a dense nature, our product of ergotin will be small.

I have here the results of five experiments on this matter. Taking 5 pounds of ergot and exhausting with water, an infusion was obtained which was brought down to 40 fluid ounces; dividing this into five parts each 8 ounces represented 1 pound of ergot.

These were severally treated by evaporation, and addition of rectified spirit, according to the British Pharmacopœia form for obtaining ergotin; but each part was brought down to a different density, so that the effects of using spirit of different strengths might be seen and compared. The fifth part was evaporated to the consistence of a soft extract, and was, in fact, simply an aqueous extract of ergot without purification.

To each of these four syrupy consistences was added 16 fluid ounces of rectified spirit, the mixture allowed to stand with occasional agitation and filtered.

Each Part equal to 1 *Pound of Ergot.*

	Evap. to s. g.	S.V.R. added fl. oz.	Equal to strength per cent.	Gummy matter etc. grs.	Equal to per cent.	Ergotin obtained grs.	Equal to per cent.
1st .	1·1	16	56	495	7·0	1112·	16
2nd .	1·14	16	64	786	11·0	803·	11·5
3rd .	1·2	16	72	1110	16·0	561·	8·
4th .	1·27	16	77	1320	17·5	407·	6·
5th .	to a soft extract = 1420 grs.						

There seems to be a discrepancy in the above figures. The total solid matter should be equal in all the above experiments; this, however, is explained by noting that the gummy matter was not dried, but simply drained on the filter, thus weighing with this gummy matter about 200 grs. of spirit.

Which of these four liquids represents the syrupy consistence of the British Pharmacopœia?

I am afraid that if we were to take a ballot on the question here opinions would not be unanimous, and I am more afraid still that makers of ergotin throughout the country have been in the same fix, until each has settled for himself what this consistence ought to be, and it seems natural that this should be so. We cannot all work to the same result unless we follow clear and definite instructions.

I notice, by the way, that the last German Pharmacopœia has improved its formula for ergotin, whose official name is extractum secalis cornuti. In the older Pharmacopœia, published in 1872, the directions were the same as in the British, except that the infusion was to be brought down to a thin syrup; this, however, had evidently been found unsatisfactory, because in the later edition of 1882 it is directed to be evaporated to one-half the weight of the ergot taken. Possibly our British Pharmacopœia authorities did not notice this; perhaps they did, and considered that the definite quantity of the German Pharmacopœia was less satisfactory than their own way of putting it, and so gave us the form we now possess. The French Codex, like our own, believes in the syrupy consistence, though the product will be more uniform than our own, as the French direct 90 per cent. spirit to be added until a certain definite effect is produced. The United States Pharmacopœia is, as usual, a model of exactness; it simply directs the fluid extract to be evaporated down to its fifth part. As the fluid extract is prepared by exhausting the ergot with a menstruum of 32 per cent. spirit, the scleromucin, phosphates, etc., are not dissolved out to any great extent, and the fluid extract requires no subsequent purification.

To illustrate my statement that different makers understand the British Pharmacopœia directions in different ways, I may mention that a few months ago I obtained several samples of ergotin for examination. Unfortunately, we are at present without a process for estimating the therapeutic value of this drug except by physiological means, and this way was not open to me, so that all I did was to find out what amount of gummy matter, etc., insoluble in 60 per cent. spirit existed in the samples, so as to obtain comparative results, concluding that the more scleromucin an ergotin contained, the less was its value as a medicine, more especially when required for hypodermic injection. If the gummy matter be simply inert, its introduction to the stomach would have no ill results; but when, as a component of ergotin, it is used subcutaneously, we are not only introducing that which is inert, but that which may give rise to local irritation on account of its comparative non-diffusibility.

The results obtained by this treatment with 60 per cent. spirit are sufficiently diverse to throw doubt on the correct performance of the experiments. I have assured myself, however, by a double series that the results are as stated.

Ergotin (*Ext Ergotæ Aquos. Purif.*) *macerated with* 60 *per cent. spirit.*

1 gave an insoluble residue (gummy mattter. etc.), 0· per cent.

2 gave an insoluble residue (gummy matter, etc.), 0· per cent.

3 gave an insoluble residue (gummy matter, etc.), 9 per cent.

4 gave an insoluble residue (gummy matter, etc.), 16 per cent.

5 gave an insoluble residue (gummy matter, etc.), 26 per cent.

6 gave an insoluble residue (gummy matter, etc.), 35 per cent.

Ext. ergotæ aquos. (unpurif.) macerated with 60 per cent. spirit gave insoluble matter 48 per cent.

While two of the samples were perfectly soluble in the diluted spirit, four varied in the percentage of insoluble matter from 9 to 35. At the same time you will notice that from the unpurified extract of ergot 48 per cent. of insolubles was obtained.

There is no doubt that ergot itself varies in the quantity of its constituents, and may vary in the proportion also, but no amount of change in that way would account for the fact of no scleromucin in one ergotin and 35 per cent. in another,

I think we are entitled to ask for light on this subject. Ergotin, as well as every other official preparation, should be the same wherever the British Pharmacopœia holds authority. It is a powerful drug, and though we cannot estimate the active principle as we do with extractum nucis vomicæ, we might have a more exact method of manufacture. Let us evaporate the fluid extract down either to a certain bulk or to a certain specific gravity before adding the S.V.R., and let us have a character or test that the finished product is soluble in a mixture of spirit and water of a certain definite strength.

This I think is a very serious matter. It is a serious matter for the chemist, who, if he make his ergotin from the 1·27 syrupy consistence will get so small a product, and which will cost so much, that he will probably not be able to sell it, or if he make it from the 1·1 syrupy consistence he may be liable to receive complaints about its weak action. It is a serious matter for the doctor whose reputation may be injured by the non-effective administration of an injection, and it is a serious matter for the patient, whose life may depend on its powerful hæmostatic properties.

A discussion followed the reading of the paper, in which the Chairman, Messrs. E. J. Woolley, W. Lane, H. Kemp, W. Elborne, and H. Wilson took part.

YORK CHEMISTS' ASSOCIATION.

The annual dinner of the York Chemists' Association was held on Thursday evening at the Old George Hotel. Mr. Sowray ably filled the position of Chairman. After the usual loyal and patriotic toasts Mr. Humphreys gave "Success to the York Chemists' Association," and Mr. Wheldon responded.

Mr. Saville gave the "Pharmaceutical Society," and the Chairman replied.

Mr. Councillor Oakley proposed the "Medical Profession," to which Dr. Oglesby answered.

Other toasts followed.

A convivial evening was subsequently spent, during which songs and recitations were given by Dr. Oglesby, Mr. Humphreys, Mr. J. Smith, Mr. Wheldon, and Mr. J. M. Smith.

OLDHAM PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association (which, by the way, has changed its name from "The Oldham Chemists' Apprentices' and Assistants' Association") was held in the Church Institute, on December 11, when the following papers were read by the members named, "The Formation and Circulation of Sap in Plants," by Mr. Swinglehurst; "Gum Acacia and its Varieties," by Messrs. John E. Wood and R. Crossdall; "Cod Liver Oil," by Mr. Tom Shaw; "A Note on Albuminous and Exalbuminous Seeds," by Mr. Burnett.

As a change from the ordinary class work it had been requested that a few of the members should read short papers on some subject of pharmaceutical interest, to which request the above gentlemen responded.

The very pleasant evening spent showed that much useful information could be obtained by meetings of this kind, and it was decided by all present that similar meetings should be held periodically.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

There was a good attendance at the evening meeting held on Wednesday, December 12, which took the form of a "students' night." These nights have now an established place in the programme of this Society, and are generally looked forward to, as the subjects discussed are of a highly interesting and pleasurable character, which on this occasion were no exception to the rule. Mr. Learoyd occupied the chair.

After the completion of some preliminary business, the Chairman called upon Mr. J. Humphrey to give his paper on "Some Makeshift Apparatus after Faraday." Mr. Humphrey in his remarks pointed out the ingenuity of Michael Faraday in his endeavours to overcome the difficulties which presented themselves during his investigations, for the want of proper apparatus. Mr. Humphrey gave instances of some difficulties, and at the same time showed some makeshift apparatus by which Faraday dispelled them; such as paper tubing and twine, tripod stand from wire and cork, and an ingenious contrivance in the place of a balance made with whalebone and twine.

The paper was listened to with the closest attention and was highly appreciated.

The Chairman then called upon Mr. G. A. Grierson to give his "Demonstrations on Pharmaceutical Tests."

Mr. Grierson said that all pharmacists should be able to guarantee the perfect quality of the drugs they sold, and the best way of doing this was by estimating the drugs themselves, instead of trusting to the wholesale houses, whose words as well as the drugs were not always to be depended upon. Mr. Grierson then tested samples of pepsine, extract of malt, simple syrup for glucose, cotton seed oil in lard, and sweet spirit of nitre, at the same time making a sample by means of acid sulphate of potash, nitrite of potash, and spirit, commonly known as Dunstan's process.

The President opened the discussion on the papers, in which Messrs. Ellinor, Preston and Hampshire joined, and the meeting closed with a hearty vote of thanks to the Lecturers.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

PHOTOGRAPHY.

BY F. V. BUTTERFIELD.

(*Concluded from page* 481.)

The first thing required in the silver salt process is some ready-sensitized albumenized paper; this can now be bought very cheaply, and consists of paper coated on one side with egg-albumen, containing also in its solution a certain amount of ammonium chloride. When dry it is sensitized by floating it on a bath of silver nitrate (made also of a particular strength), the chloride and silver nitrate of course at once reacting, the change being expressed by the equation—

$$NH_4Cl + AgNO_3 = AgCl + NH_4NO_3.$$

But at the same time the albumen is also coagulated, forming an insoluble compound, said to be silver albuminate, and thus the silver chloride simultaneously formed is prevented from sinking into or being absorbed by the texture of the paper.

Placing the negative in a printing frame, constructed for the purpose, with the film side up, lay on it a piece of the sensitized paper, cut to the proper shape and size with the albumenized surface down, and having superimposed a few pieces of blotting paper, to ensure close contact between the printing paper and the negative; fasten on the back. Next expose it to a good even light, examining the print by means of the hinged back of the frame, from time to time. It will be found necessary to print a little deeper than the required result, the subsequent processes of "toning" and "fixing" always tend to make the finished photograph a little lighter in colour.

The chemistry of silver printing is still obscure. We have, as just shown, a sheet of paper made sensitive to light, by coating it with a mixture of silver chloride and silver albuminate; ammonium nitrate, a trace of free silver nitrate and a little citric acid usually added as a preservative being also present. On exposure to the light as beneath the negative, it is darkened in colour, caused of course by the action of the light on the silver chloride and albuminate, the former being reduced to the theoretical subchloride, Ag_2Cl, and the latter, as an organic salt of silver, to a sort of sub-oxide. But our actual knowledge of what really takes place is very slight, and little progress in the matter has been made since the days of Scheele.

Having then obtained several prints from the negative, they must next be washed in two or three changes of water, allowing a few minutes for each immersion, and the last wash-water should be only slightly milky. They are then ready for the process of "toning," which really consists in gilding the silver image, thereby making the finished photograph much more pleasing in appearance and greatly increasing its durability and permanency.

Of the numerous toning solutions, I recommend the "acetate," which is made as follows:—

℞ Auri chlorid.	grs. viiss.
Sodii acetat.	℥iv.
Aq. dest.	ad Oij.

This solution, like good wine, improves with keeping, and is better prepared at least two days before required for use. Its action on the washed prints would appear to be, according to Captain Abney, expressed by the equation:—

$$2\,AuCl_3 + NaC_2H_3O_2 = Au_2 + NaC_2Cl_3O_2 + 3\,HCl.$$

The washed prints are then put into it, one by one, face downwards, and kept in constant motion to prevent overlapping and consequent uneven toning. When their foxy red colour has gradually turned to a purple tint the operation is complete, and they are at once taken out and immersed in a weak solution of sodium chloride, which immediately arrests any further action of the toning bath, then finally transferred to the "fixing" bath, which, as before, consists of a solution of hypo, 4 ounces to the pint, and after having been allowed to remain in it for about ten minutes they must be taken out and thoroughly washed, because the least trace of "hypo" left in the prints will cause them, sooner or later, to fade. For convenience in washing I have found the "Godstone" rocking tray answer admirably, and it is also one of the cheapest in the market.

The addition of a little sol. hydrogen peroxide has been recommended for the elimination of the last traces of "hypo," which it oxidizes into innocuous acid sulphate, thus:—

$$Na_2S_2O_3 + 4\,H_2O_2 = 2\,NaHSO_4 + 3\,H_2O.$$

The last wash water may also be tested by the "iodide of starch" reaction for traces of "hypo."

The end of the various chemical processes has now been reached; it only remains to trim the prints to the exact size required, by means of the cutting shapes sold for the purpose, and mount them on the usual pieces of pasteboard. For this purpose I find nothing succeeds like starch paste made *sec. artem.*

A burnisher supplies the finishing touch, greatly improving their appearance by imparting a glossy surface, but this, of course, is by no means necessary.

The intending beginner will find his greatest difficulty at the commencement to be *correct* exposure. For his under-exposed plates there is no remedy, but those a little "over" may be sometimes turned to good account by resorting to intensification. This is effected by placing the negative in a saturated aqueous solution of mercuric chloride, until the requisite amount of density is obtained. The action of the intensifier being:—

$$\underset{\text{Silver forming the image}}{Ag} + HgCl_2 = \underset{\text{Double chloride of mercury and silver.}}{AgCl{\cdot}HgCl}.$$

The plate is then well washed under the tap, and put into a dilute solution of NH_4HO, when the bleached appearance of the film is instantly turned to a jet black, caused by the action of the ammonia on the mercurous chloride, which it converts into mercurous ammonium chloride, the silver chloride being for the most part dissolved away,

$$2HgCl + 2NH_4OH = NH_2Hg_2Cl + NH_4Cl + 2H_2O,$$

and

$$AgCl + 2NH_4OH = AgNH_4NH_2Cl + 2H_2O.$$

In contradistinction to the above, we have, also, what is termed "thinning" or "reducing" the negative.

This is requisite when, during the necessarily prolonged development of a slightly *under*-exposed plate, with the aim of bringing out some more detail in the shadows, the high lights have become too dense for printing. A method recommended by H. P. Robinson answers fairly well. It consists in first wetting the refractory negative in water to swell the gelatine, then soaking it in a weak solution of calx. chlorinata, until the requisite amount of reduction has taken place.

It is also a good practice to varnish the negative before taking any prints from it, as, unless the film and the printing paper are both in a perfectly dry state, some free silver nitrate from the latter is liable to cause stains on the negative. A suitable varnish may be made from seed-lac and methylated spirit, about 3 ounces of the former to a pint of the latter. Before using, the back of the negative is gently warmed over a spirit lamp or before the fire, and a pool of varnish poured on the film, allowed to run over the entire surface, and then drained off at the opposite corner.

The alkaline "pyro" developer always stains the film more or less, thus retarding the subsequent process of printing; it is usual, therefore, to put the plate directly after development and just before fixing into what is called the "clearing" solution. This consists of a solution of citric acid and alum, about an ounce of each to a pint of water, care being taken afterwards to rinse the plate well in clean water before immersing it in the bath of "hypo," as the acid it contains is liable to decompose the sodium thiosulphate, liberating hyposulphurous acid, which at one splits up into sulphurous acid and free sulphur, which is deposited in the film.

$$2\,H_2S_2O_3 = 2\,H_2SO_3 + S_2.$$

The solution of "hypo" used for "fixing" plates or prints may be used over and over again for subsequent batches, but it must not on any account, through too frequent use, be allowed to get too *weak*, because sodium thiosulphate forms *two* double salts with silver chloride, one being soluble, the other *in*soluble, and with a weak solution there is great danger of the latter being formed:—

$$AgCl + Na_2S_2O_3 = AgNaS_2O_3 + NaCl.$$

This paper would be still incomplete without a slight reference to a few of the many useful applications to which photography has been already applied.

Besides its extended use in portraiture, it has rendered invaluable service in astronomy, and paradoxical as it may seem, nebulæ, etc., have been photographed whose existence was utterly unknown, being invisible through the most powerful telescopes, until still larger were recently constructed, when, on a careful examination of that portion of the heavens indicated, the evidence of the sensitive photographic plate was fully borne out. This is accounted for, however, by supposing that the light emitted by these nebulæ is extremely rich in chemical or actinic rays.

A grand international scheme has just been concluded with the object of obtaining a true stellar map of the entire universe. To this end photographic apparatus has been set up in the different observatories throughout the world.

By the Act of Parliament of 1871 for the prevention of crime, all criminals were ordered to be photographed during their incarceration. Some of them occasionally object to the process, and amusing incidents are related of the various "dodges" employed by the operators in securing negatives of the refractory and unwilling sitters.

In military operations its importance has not been overlooked, and a regular staff of photographers is kept at Shoeburyness.

In conjunction with the microscope, or photomicrography, good results have also been obtained, and it is even stated that "sharp" microphotographs have been secured of the ever changing amæba.

But one great problem still remains unsolved. I refer to photography in natural colours, or heliochromy. Many great workers have attempted to discover some method or means of attaining this, but hitherto it has eluded their grasp.

As the advent of photography dealt a death blow to the miniature portrait painting, which was so much in vogue at the time, it is almost certain that this branch, if ever brought to perfection, will finish the work the other begun, as the pictures so produced would be true to nature in all her beauty and perfect in every detail, and the different schools of landscape painters would sink into nothingness before the faithful reproductions of nature herself.

In attempting to treat a subject of such vast extent as photography in a short paper like this, much interesting detail has of necessity been omitted, and many very recent improvements perforce excluded. As stated at the commencement, the object throughout has been to confine the matter chiefly to the requirements of the beginner, enabling him to add another charm to his existence, to fully realise that a thing of beauty is a joy for ever, to redouble the pleasure of his annual holidays and keep them ever green by bringing back true representations of the most striking views and beauty spots encountered during his tour, or the features of friends far distant, whom he may have visited. At the same time, as much attention as possible has been given to the science of the subject, and throughout I have given those processes only which have always answered well in my own hands, and which I strongly advise the intending beginner to thoroughly master before trying any of the many new suggestions.

For the splendid exhibit of photographic chemicals, some of which are rare, and will be quite new to most of you, I am indebted to Messrs Hopkin and Williams, of Hatton Garden, a firm so well known throughout the pharmaceutical as well as the photographic world, that no comment is necessary from me. Potassium chloroplatinate and the salts of ferric oxalate are now being largely used in the different methods of platinum printing, which seems to be rapidly growing in favour. For comparison, I have here two specimens of this process, one, on the ordinary platinotype, the other on Pizzighelli's platina paper, so that you may judge for yourselves.

A great deal of attention, is being paid, at the present time, to orthochromatic photography, and already some are beginning to use these plates entirely, instead of the ordinary gelatine dry plate. As previously stated, the sensitive films are stained with some dye in this process, and experiments are still being made to discover the one best suited for the purpose. Chlorophyll, cyanine and eosine have been largely used. It appears that cyanine blue makes the plate more sensitive to yellow or orange rays, whilst eosine absorbs in the green or green yellow; but pure red rays, as in the case of the ordinary plate, have little or no effect on plates prepared with either of them.

The detective cameras (McKellen's and Kruegener's), the cyclone camera, a marvel of compactness, and especially suitable for cyclists, and the burnisher, have been very kindly lent for the occasion by Marion and Co., of Soho Square.

At the conclusion of the paper—

The President said they were deeply indebted to Mr. Butterfield for his interesting and instructive paper, the value of which was considerably enhanced by the number of beautiful photographs and unique samples of chemicals he had exhibited. Photography was by no means so easy an art as it seemed, but Mr. Butterfield had certainly done much to smooth the way for the ambitious amateur. With regard to the chemical side of the subject, he pointed out how little was really known of the chemistry of photography, and what a large field was yet to be explored by chemists in this direction. He agreed with Mr. Butterfield that the sale of photographic chemicals was distinctly a branch of trade which should be in the hands of the pharmacist, as also that of electrical apparatus. Referring to the subject of development, it struck him as remarkable that an isomer of pyrogallol should be found to answer the same purpose as pyrogallol itself. As hydroquinone was useful, it might be worth while to try its isomer resorcin, and he should be glad to hear from Mr. Butterfield if he had done so. He believed there were many photographic amateurs in the Association, and he invited them to discuss the paper fully.

Mr. Wybrant said he had dabbled in photography for some years, and had derived the greatest pleasure from the pursuit, and was glad, therefore, to hear Mr. Butterfield's concise and useful paper. As to the question of gelatine dry plate versus old wet process, he considered that it was impossible to get such a fine degree of shading with the gelatine as with the collodion process. He should like to ask Mr. Butterfield what his experience was with orthrochromatic plates. Also if it was necessary to use an alkali when employing hydroquinone as a developer. He had found some samples of sensitized paper not to keep well, developing after a time a distinct smell of valerianic acid, and he should like to ask Mr. Butterfield if he had noticed this and could explain it.

Mr. Bird congratulated the author of the paper on the capital specimens he had shown. In amateur photography the great difficulty was certainly the exposure. He had, however, long been accustomed to employ a process by which, if a plate was five times over-exposed, it yet produced a good picture. It consisted in using a developing solution of a quarter the usual strength, watching carefully, until sufficient detail appeared, then adding an excess of bromide of potash which at once checked the development, and finishing in the usual way.

Mr. Richards said that the development of the scientific part of the subject had been entirely due to chemists, and it was only right that the sale of the chemicals used should belong to the chemists. Moreover, they were the best qualified people to deal with such articles as were used in photography, most

of them being poisons. Such compounds, too, as sodio-ferric oxalate and bisulphite of potash were hardly known, except to the properly-qualified chemist. He hoped Mr. Butterfield's admirable paper would induce pharmacists to take a greater interest in photography for their own advantage.

Mr. F. A. Rogers asked if Mr. Butterfield could give him any information as to the method employed in taking microphotographs.

Mr. Tingle said he had always found one of the great difficulties to be in the proper manipulation of the toning bath. In reference to the replacement of landscape painting by photography he did not think such a thing was ever likely to take place. Photography was brutally frank, whereas the aim of the landscape painter was to combine impressions from different sources into an harmoniously beautiful whole.

Mr. Butterfield, replying to Mr. Tingle, pointed out that it was necessary that the toning bath should be kept as neutral as possible; if not carefully watched it soon became acid, and spoiled the print. In reply to Mr. Millard, he thought resorcin well worth trying, but he had not yet experimented with it. Mr. Bird's tentative method seemed to him excellent. The smell of valerianic acid noticed in silver paper by Mr. Wybrant was probably due to the use of some other albumen than that of egg; he had only observed it in inferior papers. He could not give Mr. Rogers any good process for producing microphotographs; he might, however, point out that it had been found that such photographs during development increased in size in some way, and so did not give quite accurate results.

A vote of thanks to Mr. Butterfield having been carried by acclamation, the proceedings terminated.

Parliamentary and Law Proceedings.

Pharmaceutical Society of Great Britain *v.* Harrison.

At the Greenwich County Court, on the 19th inst., the Council of the Pharmaceutical Society of Great Britain sued R. E. Harrison, of 2, Kent House Lane, Bell Green, Sydenham, to recover a penalty of £5 under section 15 of the Pharmacy Act, 1868, for keeping open shop for retailing, dispensing or compounding of poison, to wit, laudanum.

Mr. T. C. Granger appeared for the Council. The defendant appeared in person.

Upon the case being called on, defendant admitted the claim, and judgment was entered for the penalty sued for with costs.

Methylated Laudanum.

William Parr, grocer, Eye, was summoned by the Inland Revenue for selling laudanum, in the preparation of which methylated spirit had been used, at Eye, on August 23 and September 3.

Mr. Owen, supervisor, conducted the prosecution, and explained that spirit of wine was usually used to prepare laudanum, but this was exciseable, whereas methylated spirit was not, and thus the excise was evaded.

Thomas Cox proved the purchase of the laudanum in the months of August and September.

Dr. John Holmes, in the Laboratory of Somerset House, stated that he received the laudanum on the 7th of September last, and found in it methylated spirit. Methylated spirit being spirit of wine mixed with naphtha, it was not used for internal consumption. The aniline dye produced was the result of methylated spirit being present.

Mr. Buckle, in defence, said the whole thing was the result of an accident. Defendant took up the "Spr. vini meth." jar instead of the "Spr. vini rect." jar, and mixed with the opium of which laudanum was made. The jars were in every way similar.

The Bench said they had no doubt that the Defendant did mix the methylated spirit with the laudanum for the purpose of saving himself the expense of the spirit of wine. The maximum penalty was £100, and he would be fined £10 without costs.

Death from an Overdose of Chloral.

Mr. A. Braxton Hicks, the Mid-Surrey Coroner, held an inquiry on Monday last at Barnes, into the death of Mr. Hugh Burrowes, aged twenty-eight years, secretary to the Brewers' Engineers' Company (Limited), who died on the 14th instant.

Mrs. Maude Burrowes, the widow, said her husband had been in bad health for some time, having suffered very much from neuralgia during the past three years. He took some chloral for the first time to her knowledge about three months ago, and a month afterwards he took an overdose, and medical aid had to be summoned. He then promised not to take any more. He was absent from Monday till Thursday, when he returned at four o'clock complaining of neuralgia. He gave her to understand that he had had a dose of chloral at a chemist's at Charing-cross, but she did not see whether he had any more in his possession. They retired to rest at half-past ten, and an hour and a-half later witness was aroused by her husband getting into bed. He had lighted a candle. Witness did not notice a smell of chloral. She asked him the time, and he answered her. At four o'clock the next morning she found that he was cold, and thought he had fainted, but seeing that his face was quite colourless she sent for a doctor, who arrived and pronounced life extinct. He had never given her any reason to suppose that he would commit suicide.

Dr. Richard Lake, of Barnes, said that he was called in to see the deceased on Oct. 29, when he was suffering from chloral poisoning. He had taken about 150 grains, and it was some considerable time before he recovered. Witness subsequently attended him for a mild epileptic seizure, which was the result of an accident in June. When he was summoned early on Friday morning, he found him dead. There was a faint smell of chloral about his mouth, and on a table witness noticed a tumbler containing a small quantity of fluid other than water. The cause of death, in his opinion, was syncope, the result of an overdose of chloral acting upon a weak heart.

By the Coroner: A person could buy most dangerous doses of chloral made up in the form of patent medicines as easily as possible, but a chemist could not supply chloral itself without going through the prescribed form except by breaking the law.

The Jury returned a verdict "that the deceased died from the effects of an overdose of chloral, taken by misadventure."—*Standard.*

Obituary.

Notice has been received of the death of the following:—

On the 2nd of December, Mr. Joseph Gillett, Chemist and Druggist, Nevill Street, Southport. Aged 76 years.

On the 12th of December, Mr. Richard Clay Wycherley, Chemist and Druggist, Lancaster Road, Preston. Aged 51 years.

On the 12th of December, Mr. Alfred Broughton, Chemist and Druggist, Meadow Lane, Leeds. Aged 55.

On the 14th of December, Mr. Edward Brown, Pharmaceutical Chemist, The Saltisford, Warwick. Aged 48.

On the 14th of December, Mr. Joseph Wilson, Pharmaceutical Chemist, Corn Market, Penrith. Aged 61 years. Mr. Wilson had been a Member of the Pharmaceutical Society since 1855.

Correspondence.

Half and Half Chemical Formulæ.

Sir,—I cannot ignore the letter of an old pupil, but really Mr. Tingle must not expect me to find an excuse for that very small proportion of writers who employ the expression $\frac{1}{2}H_2O$. They either do or do not intend that O shall stand for an atom of oxygen and H_2O for a molecule of water. If they do, then in writing $\frac{1}{2}H_2O$ they are inconsistent. If they do not they are either benefactors or iconoclasts, according as they are or are not prepared to produce better theories than those on which the science of chemistry is at present so largely founded.

John Attfield.

The Chemical Formulæ of Solid and Liquid Bodies.

Sir,—I consider it unnecessary for me to draw attention to what I regard as fallacies in the statements which have been made in reply to my letter of December 1st, since that letter in itself contains sufficient to do so, and I think it makes clear my reasons for employing the formulæ to which exception has been taken. Having failed to convince me, one of your correspondents might now try to persuade other scientific chemists, including some of the most distinguished authorities, that in making use of similar expressions they also are guilty of writing "nonsense and non-science."

The frequent occurrence of such formulæ in papers read at the meetings of the Chemical Society and the Royal Society affords many opportunities for a reiteration of the assertion that their use "involves a fast and loose way of dealing with those atomic and molecular theories on which the science of chemistry is at present based."

Wyndham R. Dunstan.

Sir,—I have with much interest followed the recent controversy respecting the formula of tartar emetic. And I think it is obvious that the formula in question was used by Professor Dunstan for the sake of its greater simplicity (*i.e.*, to save a multiplicity of figures in the calculations made).

But since then the correctness of such formulæ (as regards the science of chemistry) has been promulgated to a certain extent. Mr. Tingle, in a recent paper, points out "that such formulæ are not innovations, are not opposed to modern and authoritative use, and are in no way inimical to the principles of the atomic theory, because it is neither concerned with, nor touched by them."

Granting the two first statements, may I ask whether the indiscriminate use of such formulæ is not inimical to a clear conception of the atomic thory—a theory upon which the science of chemistry is based. Chemistry certainly has not reached finality, nor is it reasonable to suppose it ever will. The indivisibility of the atom may not be universally accepted. But it is as well to remember that for the purposes of chemical reasoning the atomic theory is indispensable—at least in the present state of our knowledge. Having this in view I respectfully ask whether it is not more correct to regard the molecule of tartar emetic as $(KSbOC_4H_4O_6)_2,H_2O$ than the formula under discussion; for if we write the formula as half of this, then we inevitably split the molecule of water and which according to our present theory is incorrect. That it is admissible to use fractional formula *for purposes of calculation* must be patent to all. I hope more of your readers will enter into this discussion on account of its importance.

A. E. Slinn.

At Last! "What is Laudanum?"

Sir,—I was delighted to see the answer to my query "What is Laudanum?" "by authority," given in Dr. Quain's letter.

When writing my former note I was not unacquainted with the history of Sydenham's liquid laudanum. And the further fact that every educated pharmacist in the conduct of his business in retail would supply tr. opii for laudanum. But technically laudanum was not tr. opii, but vin. opii. Now the only answer worth anything on this point is forthcoming. The synonym of laudanum is tinctura opii. Why should not many others be added, my old friend lac sulphuris to wit?

G. Ellinor.

The Hybridisation of Cinchonas.

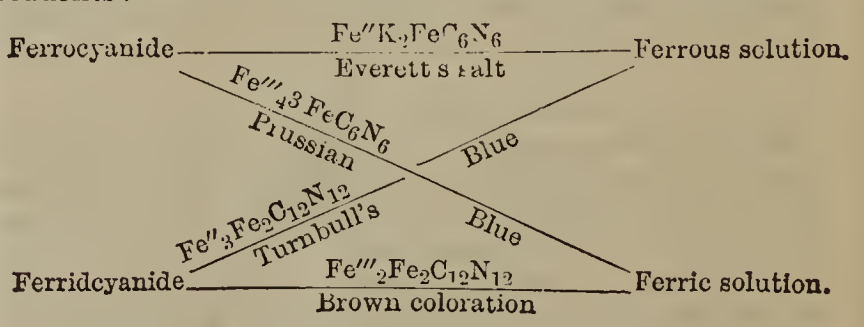
Sir,—The paper on the above subject, kindly read for me by Dr. Thresh at the Bath meeting of the Pharmaceutical Conference, met with some criticism, which requires a brief reply. The object of the paper was to point out, what does not seem to have been done before, that in each of the two species of cinchona, *succirubra* and *officinalis*, there is a characteristic arrangement of alkaloids, and that these characteristics are blended in the hybrids. Such an arrangement cannot be intelligibly represented by quoting the actual analysis of the barks with their varying totals, but only by giving the centesimal composition of the alkaloids, for whether the totals be high or low, the peculiarity of the arrangement is to a great extent preserved in each species. The fifty crown barks were nearly all taken under the supervision of the Director or myself from what are known as *pukka* officinalis trees, growing on the Nilgiris, away from the succirubra; barks of the richer species, as *angustifolia*, were purposely omitted, and it must be remembered that mossed and renewed barks are eliminated from the table. I must, therefore, ask Mr. Hodgkin to withdraw his statement that my crown barks were taken from hybrid trees. I thought the nomenclature of hybrids was now well understood by those who have anything to do with cinchona; since it is not, I may explain that "*robusta*" is a term applied in Ceylon to all forms between officinalis and succirubra, while on the Nilgiris two forms are specified as *pubescens* and *magnifolia*, and I prefer using these older terms given originally by Mr. McIvor.

I cannot answer for the Indian Government, but the Government of Madras has no desire to grow worthless barks. The useless varieties, such as *pahudiana*, *micrantha* and *nitida*, once cultivated so largely, are now exterminated; the whole of Dodabetta plantation, some 300 acres in extent, is under crown bark, a kind Dr. Paul himself recommends. At Naduvatam the succirubra trees are giving way to hybrids raised from analysed seed of trees giving about 5 per cent. of sulphate of quinine in their bark. The ledger and its hybrid will not grow on the Government plantations, and much time has been wasted in attempting its propagation. The hybrid of red and crown species not only gives a large outturn of bark per tree, but it also stands renewal better than other cinchonas. With such trees in the estates we do not consider the cultivation to have failed in producing barks fit for the manufacture of quinine.

Ootacamund. D. Hooper.

Ferrocyanides and Ferridcyanides.

Sir,—While "reading up" the ferrocyanides and ferridcyanides, the following graphic idea struck me as serviceable to the memory, which may be of utility to some fellow students:—



The compounds on the lines are those which are formed by that order of mixing the solutions at the corners.

A ferrous salt added to either a ferrocyanide or ferridcyanide forms a ferrous compound, and a ferric salt with a ferrocyanide or ferridcyanide a ferric compound in the same manner.

Ferric ferrocyanide = Prussian blue $Fe'''_{43}FeC_6N_6$.

Ferrous ferrocyanide of potassium = Everett's salt $Fe''K_2FeC_6N_6$.

Ferric ferridcyanide = brown coloration $Fe'''_2Fe_2C_{12}N_{12}$.

Ferrous ferridcyanide = Turnbull's blue $Fe''_3Fe_2C_{12}N_{12}$.

London. Guy Sapwell.

Communications, Letters, etc., have been received from Messrs. Sowerby, J. C. Umney, Wolstenholme, Ferryman, Moss, Stark, Assistant.

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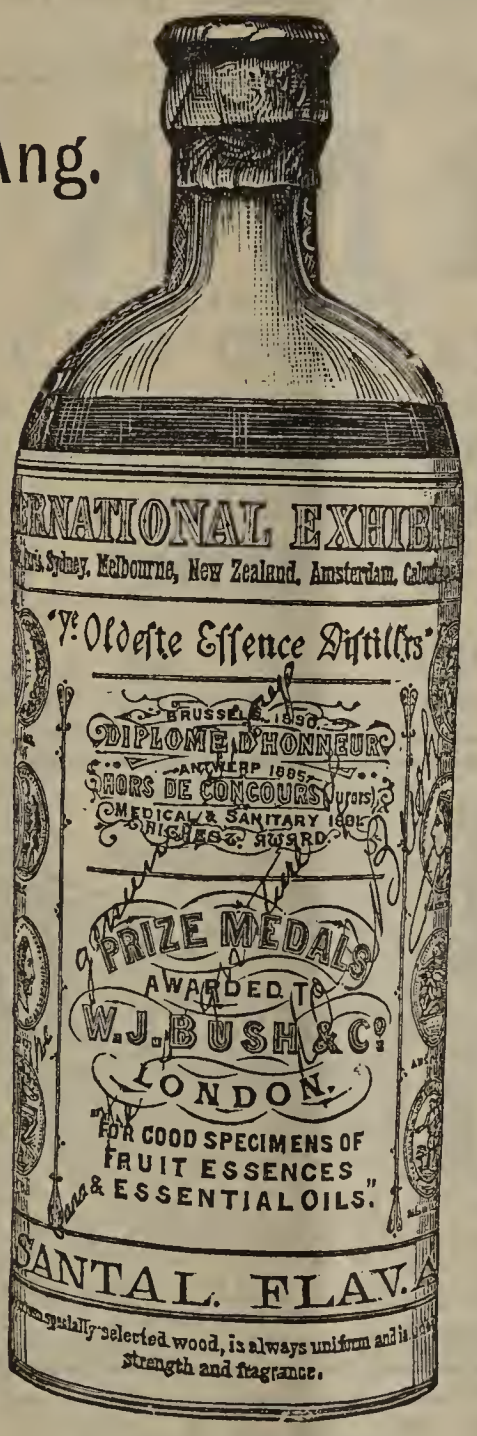

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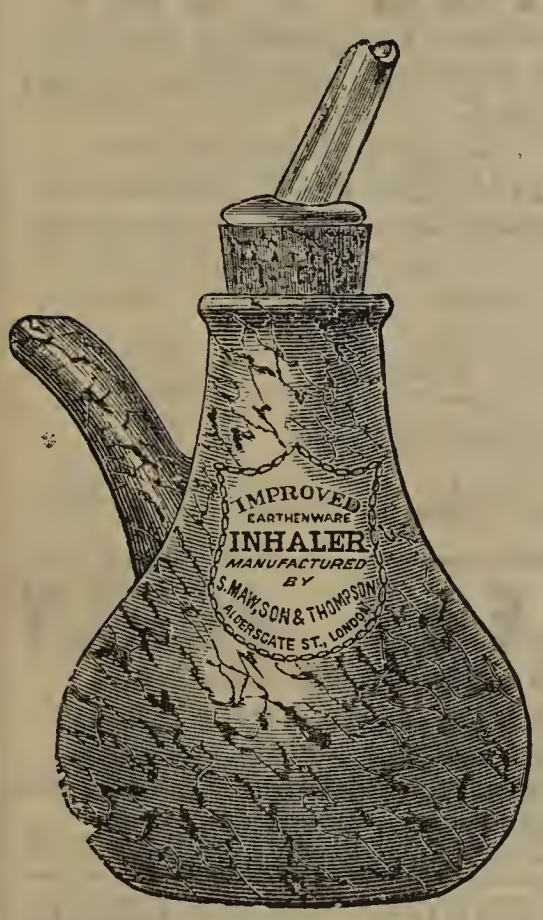

Fig. 8.
MAW'S IMPROVED.

Fig. 6.
MAW'S DOUBLE-VALVED.

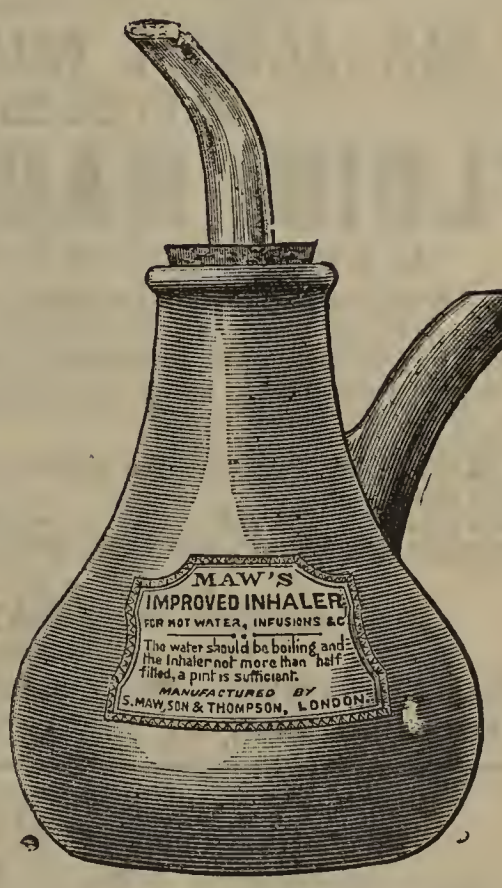

Fig. 8a.
MAW'S IMPROVED.

Fig. 6.—Double-Valved, 60s. per dozen; with Elastic Tubes, 78s.
Fig. 8.—Marbled, 32s. per dozen. Fig. 8a.—White, 21s. per dozen.
Fig. 8a.—White, half size, 13s. per dozen.

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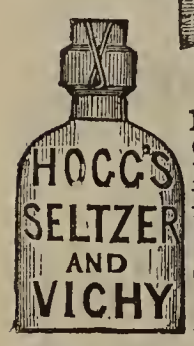

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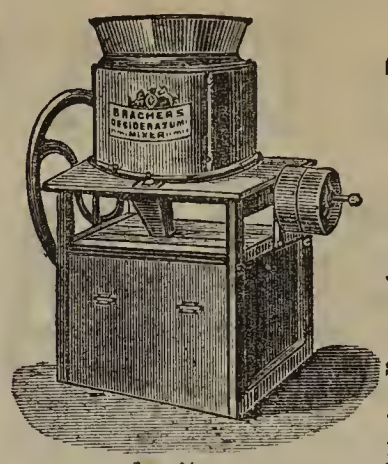

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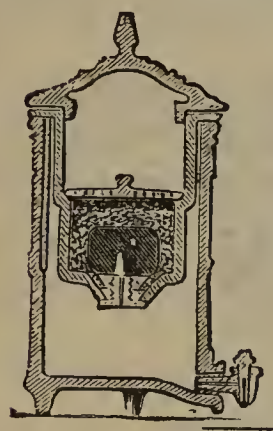

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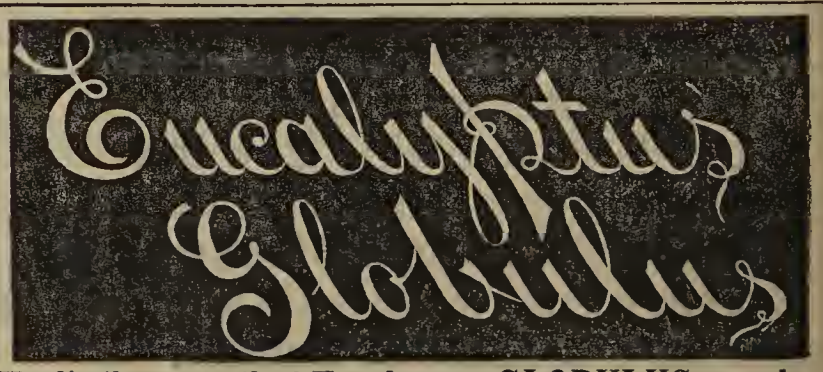

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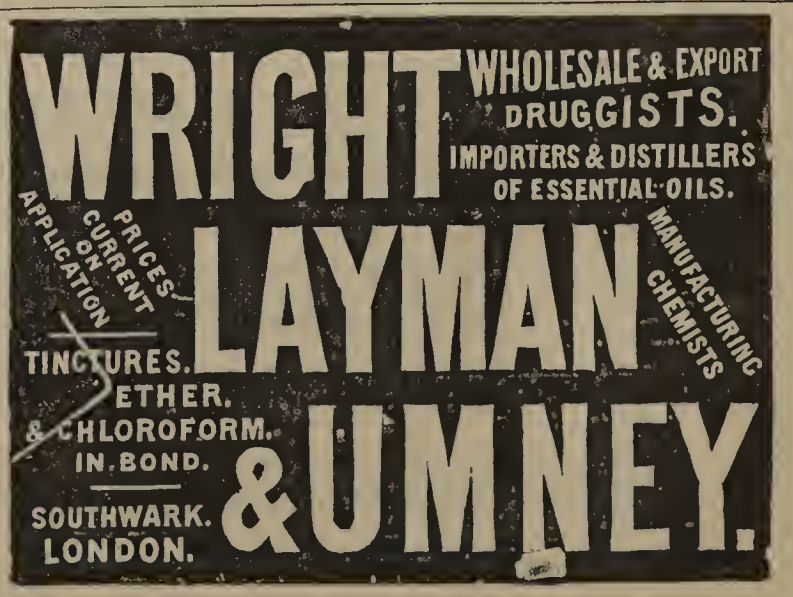

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 966.] SATURDAY, DECEMBER 29, 1888. [PRICE FOURPENCE.

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MARKHAM, A. D.	Private Tutor	19
MAW, SON & THOMPSON	Chest Protectors	13
" " "	Quarterly Price Current	
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" " "	Medicinal Gelatine Capsules	
" " "	McK. & R. Pills	7
" " "	Menthol Cones	
MAY & BAKER	Manufacturing Chemists	
MAY, ROBERTS & CO.	Catalogue	2
McKESSON & ROBBINS	Ovoid Capsuled Pills	7
MERCS, L.	Almilaj	
MOTTERSHEAD & CO.	Benger's Preparations	
MUMFORD, G. S.	Crushed Linseed	6
MURRAY, SIR JAS.	Fluid Magnesia	14
NEWBERY, F., & SONS	Warner's Specialities	12
ORRIDGE & CO.	Transfer Agency	23
PATTISON, G.	Bath Gloves, &c	
PEAKE, ALLEN & CO.	Chemists, Druggists, &c.	
PEARS, A. & F.	Soap	
PHARMACEUTICAL SOCIETY of GREAT BRITAIN	Official Notices	1
PORTMAN SCHOOL OF PHARMACY		
POTHS, H., & CO.	Poison Bottles, &c.	
POTTER & CLARKE	Botanic Druggists	
POWELL, THOS. (Ld.)	Balsam of Aniseed	16
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QUIBELL BROS.	Disinfectants	
RANDALL & SONS	Black Currant Lozenges	17
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ROBINSON & SONS	Lint	
SAINSBURY, S.	Lavender Water	14
SALE BY AUCTION		
SANGER, J., & SONS	Prices Current, &c.	
SANITAS CO.	Disinfectants, &c.	4
SAUNDERS, J. W.	Private Tutor	19
SAVORY & MOORE	Peptonised Cocoa and Milk	15
" "	Peptonising Pellets	
SCHILLINGER, A.	Dr. Angerer's Pastils	14
SCHOOL of PHARMACY of the PHARMACEUTICAL SOCIETY		
SEABURY & JOHNSON	Pharmacal Laboratories	16
SELLERS, J.	Carmine Pur.	
SHIRLEY, A. W.	A. 1. Brand Menthol	16
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SKIDMORE, T., & SON	Iron and Steel Safes	18
SLACK & BROWNLOW	Filters	14
SMITH, W. F.	Dandelion Pills	16
SMITH, S., & CO.	S.V.R. Spirits of Wine	4
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SPIRONE CO.	Churchill's Inhalant	
SPRATT'S PATENT (Ld.)	Dog Biscuits, &c.	8
SQUIRE & SONS	Elixir of Cascara	
ST. DALMAS, A. DE	Emp. Hœmostaticus	
STERN, G. & G.	Pumiline	15
SYMES & CO.	Ol. Limonis	17
TAYLOR, T. & F. J.	Aërated Waters	17
TO BE LET		
TOMLINSON, R., & SONS	Shop Fittings	
TRADE MARK PROTECTION ASSOCIATION		14
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VAN HOUTEN	Cocoa	10
VERNON, W. H.	Private Tutor	21
WALKER & DALRYMPLE	Chemists' Tea Agency	18
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WERNER & PFLEIDERER	Pill Machines	
WESTMINSTER COLLEGE of Chemistry and Pharmacy		20
WHITE, A., & SONS	Manufacturing Chemists	
WHITLA, Dr.	Work on Pharmacy, &c.	
WILLOWS, FRANCIS & BUTLER	Wholesale Druggists	
WILLS & WOOTTON	Text Books	
WOODS, W.	Areca Nut Tooth Paste	
WOOLLEY, J., SONS & CO.	Manufacturing Chemists	5
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TRADE **"SANITAS"** MARK.

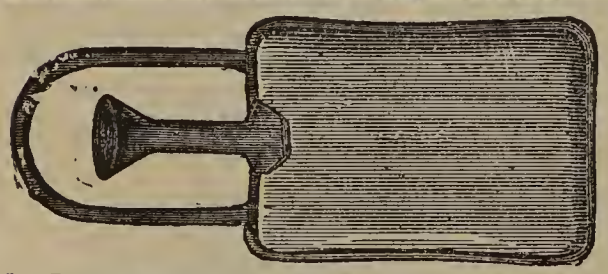
DISINFECTANTS

(FLUIDS, POWDER, SOAPS),

NON-POISONOUS, PLEASANT and BEST. Gold Medals—Calcutta, 1883-84; Paris, 1885; Antwerp, 1886.

THE "SANITAS" COMPANY, Limited, Letchford's Buildings, Bethnal Green, London.

SOLE MANUFACTURERS ALSO OF KINGZETT'S BACTERICIDES.



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ENEMAS, URINALS, FOR DAY OR NIGHT. **TUBING, CORKS, TEATS**

HOT WATER BEDS, PILLOWS, CUSHIONS, & BOTTLES.

ELASTIC STOCKINGS AND KNEE-CAPS, &c.

J. L. HANCOCK, 266P, Goswell Rd. Works: Goswell Mews, & 55, 56, 57, 58, 59, 60 & 61, Moreland St., London, E.C.

S.V.R.

PURE GRAIN SPIRIT 56 O.P. ... 18/5

Do. Do. DOUBLE DISTILLED 18/9

Cash with Order. Reductions for larger Quantities than Two Gallons.

SAMPLES FREE.

STEPHEN SMITH & CO., BOW, LONDON, E.

Trade Notice.

TO PREVENT DISAPPOINTMENT,

S. MAW, SON & THOMPSON

Beg to inform the Trade that their

ESTABLISHMENT WILL BE CLOSED

ON

Monday, Tuesday & Wednesday, the 24th, 25th & 26th inst.

FOR THE

CHRISTMAS HOLIDAYS

AND ALSO ON

Saturday and Monday, the 29th and 31st inst.

FOR THE

PURPOSE OF STOCK-TAKING.

7 to 12, Aldersgate Street, London.

Spiritus Ætheris Nitrosi

Guaranteed to contain the proportion of Nitrous Ether directed by the British Pharmacopœia.

Æther Nitrosus and Sol. Ætheris Nitrosi

Respectively 8 and 4 times the strength of the Spirit.

Sol. Æthyl Nitritis.

Containing **3 per cent.** of **Pure Nitrite of Ethyl,** in Absolute Alcohol and Glycerine.

See paper by Professor LEECH on "The comparative effects of Spiritus Ætheris Nitrosi and Solution of Ethyl Nitrite," *Pharmaceutical Journal*, Dec. 22, 1888.

Spirit. Ammoniæ Aromaticus

Made from Volcanic Ammonia.

JAMES WOOLLEY, SONS & CO.

Manufacturing Pharmaceutical Chemists

MANCHESTER.

PRICE LIST FORWARDED ON APPLICATION.

LOFTHOUSE & SALTMER,

Manufacturing Chemists, Wholesale & Export Drug Merchants,

HULL.

Manufacturers of all Pharmaceutical Preparations on the best and most improved principles.

QUOTATIONS ON APPLICATION.

SOLUT. ÆTHERIS NITROSI (Æther. Hyponit.)

1 part to 5 Sp. Vini Rect. 56 o.p. makes Sp. Æth. Nit. 850.

This concentrated preparation is carefully drawn in our own laboratory, is highly recommended, and is daily finding increased favour with the trade for making Sp. Nitre, as required for use, and thus avoiding the risk of a development of free acid, which is more or less prevalent in Sp. Nitre that has been drawn some time.

Price in Winchester Quarts, 3*s.* per lb., net.

Importers of Cod Liver, Castor, and Olive Oils; Otto de Rose, and all Essential Oils; Valentia Saffron; Vanillas; Fruit Essences; Carmine; Aniline Dyes; Bees Wax, &c., &c.

APPLICATIONS FOR SPECIAL QUOTATIONS INVITED.

BURROUGH'S SPIRITUS RECTIFICATUS, P.B.

SPIRITS OF WINE CHEMICALLY PURE

The Best English Grain Spirit, free from Fusel Oil.

ALSO FINEST ORANGE WINE AND SHERRY FOR MEDICINAL PURPOSES.

CALE STREET DISTILLERY, LONDON, S.W.

Duty free for Exportation—also best Methylated Spirit at lowest prices.

TRADE MARK REGISTERED.

LEECHES! LEECHES!

Warranted Healthy, Wholesale and for Exportation.

Choice quality, Hambro' speckled and Officinal Green. A constant supply always on hand. Delivered free to all parts of London daily.

Special Terms to Wholesale Druggists, Leech Merchants, and Exporters.

FITCH and NOTTINGHAM, Leech Breeders,

MARSEILLES AND 4, CANONBURY SQUARE, LONDON, N.

MUMFORD'S

FARRINGDON ROAD, LONDON, E.C.

PURE CRUSHED LINSEED IS NOW

17/- cwt. CARRIAGE PAID

TO ANY RAILWAY STATION IN ENGLAND.

PATRONISED BY HER MAJESTY.

BARBER'S ORIGINAL CRIMSON MARKING INK,

WHICH IS CHANGED BY HEAT TO A JET BLACK.

Put up for Retail Sale in 6d., 1s., 2s., 2s. 6d., and 5s. Bottles. Also

Barber's Concentrated Liquid **COCHINEAL,** for Colouring Jellies, Custards, &c.

Put up in 6d. and 1s. Bottles.

Also BARBER'S ARTIFICIAL IVORY for Filling Decayed Teeth, 1s. per packet.

MANUFACTURED ONLY BY THE PROPRIETORS—

G. BARBER & CO. Club Moor, LIVERPOOL.

Can be obtained through any of the Wholesale Firms in Great Britain, or from FELTON, GRIMWADE & CO., Melbourne; ELLIOT BROS., Sydney and Brisbane; KEMPTHORNE, PROSSER & CO., Dunedin and Auckland; FELTON, GRIMWADE & CO., Wellington; or direct from the Manufacturers—G. BARBER & CO., Club Moor, Liverpool, England.

Quinine, Pharmaceutical & other Chemicals

London, 1851.

Eſtabliſhed 1798.

London, 1862.

Howards & Sons

Gold Medal, Calcutta, 1884.

Paris, 1855.

Paris, 1867.

City Mills, Stratford, Eſſex.

A TASTELESS TONIC LAXATIVE GRANULE.

EXACT SIZE.

Bottles containing 25 Pills, 7s. per doz.; Bottles containing 100 Pills, 24s. per doz.

Formula, Aloin, Strychnine, and Belladonna.—McK. & R. Pills.

Aloin	1–5 gr.
Strychnina	1–60 gr.
Ext. Belladonnæ	1–8 gr.

Dose.—One pill three times a day. Morning, noon, and night. Where a painless peristaltic action is desired by the aged or female patient, one pill may be taken every night or second night at bedtime, as directed by medical attendant.

Since introducing this formula to the profession and adding the granule to our list our sales have been exceedingly large. Over one million were dispensed last year. We have received numerous letters and reports from physicians, speaking in the highest terms of the results of their administration, and thanking us for introducing this granule to their notice.

From M.D., M.R.C.P., London, October 13th, 1886.

"*These Tonic Laxation Pills can be taken with advantage in those cases* (*mainly female*) *where tonics alone set up strangury from their action upon the vesical centres in the spinal cord.*"

Aloin, Strychnine, and Belladonna Pills are prepared by McKESSON & ROBBINS, NEW YORK, expressly for the use of Physicians and Surgeons, and to be dispensed in Prescriptions.

In this form the ingredients are not only perfectly preserved, but do not affect the teeth, or offend the palate, and, further, can be conveniently kept out of sight by those who object to be regarded as invalids. Complete list mailed free on application. PLEASE SPECIFY McK. & R. PILLS.

Originated 1870 by McKESSON & ROBBINS, New York, U.S.A.

London Agency: Messrs. S. MAW, SON & THOMPSON, 7 to 12, Aldersgate St., E.C.

Merchants, Shippers, and the Wholesale Houses in the Trade are also Supplied by—

Messrs. BURROUGHS, WELLCOME & CO., Snow Hill Buildings, London, E.C.;
and Messrs. HOCKIN, WILSON & CO., 38, Duke Street, Manchester Square, London, W.

The Chemists Aërated & Mineral Waters Association, Limited

London · Harrogate · Bristol

The Chemists' true friend, established in 1878 to supply Chemists only with the highest quality of Aërated Waters at the lowest co-operative prices.

Received with doubt, it worked its way uphill to success, and now fills more syphons than any maker in the United Kingdom.

Number of Members about 2000. Last dividend 7½ per cent.

SECURE A SHARE WITHOUT DELAY.

Write Secretary, 45, Gifford St., Caledonian Rd., London, N., for Samples, Prices, &c.

FOR ALL

CANINE AILMENTS

SPRATT'S PATENT, LIMITED,

DOG MEDICINES.

Show Cards supplied, also Pamphlets on Dog Diseases for gratuitous distribution.

Trade Terms of SPRATT'S PATENT, LIMITED, London, S.E., or your Wholesale House.

BEECHAM'S PILLS.

BEECHAM'S PATENT PILLS. ST. HELENS LANCASHIRE

TRADE MARK.

The most Marvellous Medicine of the Age for Bilious and Nervous Disorders, Indigestion, and Female Complaints.

The Demand is unprecedented, and the Sale is by far the Largest of any Patent Medicine in the World.

Prepared only, and Sold Wholesale and Retail, by

THOMAS BEECHAM,

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BEECHAM'S PATENT PILLS. ST. HELENS LANCASHIRE

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Telegraphic Address—"CUBANS LONDON."

FREDERIC R. CRESSWELL.
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CRESSWELL BROTHERS

Sponge Importers & Merchants

SPONGES OF EVERY DESCRIPTION DIRECT FROM

GREECE, TURKEY, THE BAHAMAS, FLORIDA & CUBA.

2, RED LION SQUARE, LONDON, W.C.

(Next to Church), Also Nos. 1 & 13a, RED LION SQUARE.

GOLD MEDAL

(HIGHEST AWARD)

Awarded to CRESSWELL BROTHERS,

BRUSSELS EXHIBITION, 1888.

CRESSWELL BROTHERS' Sponges at the Antipodes.

From the "AUSTRALASIAN JOURNAL OF PHARMACY," August 20th, 1888, Melbourne Centennial Exhibition.

"CRESSWELL BROTHERS, 1 and 2, Red Lion Square, London.—This well known house has an admirable exhibit of all kinds of sponges, their exhibit being one which commands the attention of the most careless visitor to Australasia's great show, where there is so much to be seen. The sponges are displayed both in the natural and prepared condition, and include some very fine specimens. As is well recognised, this enterprising Firm has spared no trouble to meet the requirements of the retail trade, the high prices of sponges in recent years having made them rather expensive to stock in variety; but by their arrangement of carding, stringing, and classifying, it is easy to procure just the quality and quantity required for any business. The sponges bleached by the permanganate process are of exceptionally good colour and seem unaffected in quality by the process."

SPONGES by the CASE, BALE, BIN, STRING, BOX, CARD, POUND or PIECE.

For full particulars see Cresswell Brothers' new Illustrated Price List.

A SPECIALITY.—Natural and Unbleached Sponges packed at Cresswell Brothers' own Establishments at the Fisheries.

CRESSWELL BROTHERS, 1, 2 & 13a, Red Lion Square, (Next to Church), LONDON, W.C.

No connection whatever with a Company trading under a similar name in the same Square.

THE DIAMOND MARK.

To secure the best Hungarian Aperient Water,

DEMAND THE DIAMOND MARK,

And insist upon receiving the HUNGARIAN APERIENT WATER sold by the APOLLINARIS CO., LIMITED, LONDON.

Of all Druggists and Mineral Water Dealers.

Fry's Pure Cocoa

CONCENTRATED

SOLUBLE

Prepared by a New and Special Scientific Process, securing extreme Solubility.

A large number of Testimonials, approving in the highest terms of this article, have been received from the Medical Faculty, who state that they have not only adopted it for family use, but have also recommended it in many cases to their patients.

Apply for Samples and Copy of Testimonials to the Manufacturers,

J. S. FRY & SONS, Bristol; London; and Sydney, N.S.W.

VAN HOUTEN'S COCOA.

EASILY DIGESTED—PURE—SOLUBLE—MADE INSTANTLY.

INCOMPARABLY THE BEST & MOST ECONOMICAL.

Very strong & nutritious, THIS Cocoa is cheaper & more satisfying than tea.

"Admirable," "flavour perfect," "and SO PURE." } BRITISH MEDICAL JOURNAL. } "Delicate aroma," "PURE & unmixed," "goes a long way." } THE LANCET.

"Once used, always used."—HEALTH.

SAMPLE TINS GRATIS { through your grocer or chemist.

ROBARE'S AUREOLINE

OR GOLDEN HAIR WASH.

The attention of the Trade is respectfully called to the above Article, now having a large sale, and giving an excellent profit to the retailer.

5/6 size	... ...	36/- per Dozen.
10/6	... ...	72/- „

Sole Wholesale Agents, R. HOVENDEN & SONS, LONDON.

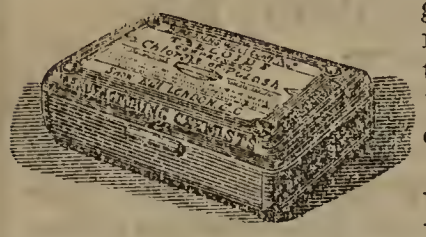
The Throat and Voice.

LONDON.] DECEMBER 29TH. [1888

Chlorate of Potash Tabloids.

FOR AFFECTIONS OF THE VOICE, THROAT AND RESPIRATORY SURFACES GENERALLY.

By using the Tabloids the drug is effectually brought in contact with the oral mucous surfaces as a continuous gargle, and its specific action made certain. In acute sore throat, Chlorate of Potash "usually relieves the uneasiness in a few hours" (Cohen). "It is used in ulcerated mouth and follicular pharyngitis, and has been employed in croup, diphtheria and spasm of the larynx" (Brunton).



"Of convenient size, they are beautifully made; and, as they dissolve slowly in the mouth, are well suited for throat affections."—THE LANCET.

Supplied to the Trade in beautifully graven white metal boxes, blue silk label, at 4*s.* and 8*s.* 6*d.* per doz. Retail prices, 6*d.* and 1*s.* each.

Chlorate of Potash and Borax Tabloids.

The Tabloids afford an agreeable form in which to administer Chlorate of Potash and Borax.

Supplied to the Trade in beautifully graven white metal boxes, pink silk label, at 4*s.* and 8*s.* 6*d.* per doz. Retail prices, 6*d.* and 1*s.* each.

Chloride of Ammonium Tabloids.

The solvent and discutient as well as antiphlogistic powers of Chloride of Ammonium are well known, and have led to its extensive employment in cases of sore throat and bronchitis, attended with abundant secretion of thick and tough mucus or phlegm. The Tabloids slowly dissolving secure direct and continuous contact with the inflamed surface. They quickly mitigate irritation, and lessen expectoration.

Two or three of the Tabloids will sometimes entirely relieve coughs that have long resisted treatment with ordinary remedies.

Supplied to the Trade in bottles at 4*s.* 6*d.* and 12*s.* 6*d.* per doz. Retail prices, 6*d.* and 1*s.* 6*d* each.

Voice Tabloids.

Composed of COCAINE, *Chlorate of Potash and Borax.*

Impart a clear and silvery tone to the voice. Easily retained in the mouth while singing or speaking. Now used by the leading singers and public speakers throughout the world.

DIRECTIONS.—A single Tabloid may be slowly dissolved in the mouth to remove huskiness or hoarseness.

Supplied to the Trade in beautifully graven white metal boxes, blue silk label, at 8*s.* and 16*s.* per doz. Retail prices, 1*s.* and 2*s.* per box.

Sal Prunella Tabloids.

(NITRATE OF POTASH).

"A popular remedy, sometimes successful in mild cases of incipient inflammatory sore throat, is a small piece of nitre allowed to dissolve slowly in the mouth" (Waring).

DIRECTIONS.—One or more (5 gr.) Tabloids should be dissolved slowly in the mouth for the local effect.

Supplied to the Trade in bottles of 100 at 14*s.* per doz. Retail price, 1*s.* 6*d.* each.

Hazeline.

The Witch Hazel Plant.

This drug is highly commended by the British Medical Association's Committee on Therapeutics. Hazeline, being prepared from the fresh green twigs, contains all the valuable volatile principles of the plant Witch Hazel, and is much more uniform and reliable in its action than are the tinctures, fluid extracts, etc., prepared from the dried bark.

DIRECTIONS.

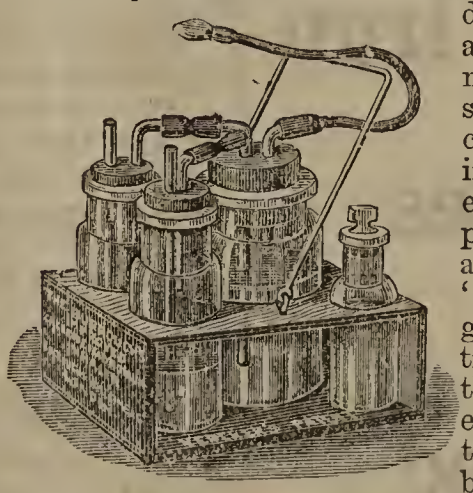
In catarrh or cold in the head, may be sniffed up the nostrils with an equal part of tepid water.

Dose for irritated or inflamed throat and lungs half to one teaspoonful occasionally.

Supplied to the Trade in ½ lb. and 1 lb. bottles at 14*s.* and 42*s.* per doz. Retail prices, 1*s.* 6*d.* and 4*s.* 6*d.* each.

Vereker's Chloride of Ammonium Inhaler.

"The neutral vapour of Chloride of Ammonium removes unhealthy and offensive secretions, and restores the long diseased or weakened nasal and respiratory mucous membrane to a healthy state, so that in cases of catarrh, where thickening, induration, and irritation exist, a most decided improvement is brought about in a short time." In "throat-cough," pharyngeal irritation, and relaxation and weakness of the throat, it acts as a most effective alterative and tonic to the mucous membrane.



Dr. FRANKS, Dublin University, says:—"It is the best I have ever used, and I think I have tried all."

Dr. SMYLY, Ex.-Pres. Royal College of Surgeons, Ireland, says:—"It is the best Inhaler for Chloride of Ammonium I have met with."

Supplied to the Trade at 7*s.* 6*d.* each. Retail 10*s.* each.

BURROUGHS, WELLCOME & CO., Snow Hill Buildings, LONDON, E.C.

ABOVE PRICES SUBJECT TO USUAL DISCOUNT.

WM. R. WARNER & CO.

PHARMACEUTICAL CHEMISTS.

DEPOT:

F. NEWBERY & SONS,

1, KING EDWARD STREET, NEWGATE STREET, LONDON, E.C.

The Preparations of W. R. WARNER & CO. are now in general use by Practitioners in all parts of the World, and should be kept regularly in stock by all Chemists.

Bromo-Soda

Bromide of Sodium with Caffeine, in the granular form. Very carefully and evenly made. Invaluable in Sleeplessness, Brain Fatigue arising from overwork, &c. *The Lancet* (Aug. 6, 1887, p. 265) states that "the sodium compound does, in fact, agree better (than the potassium salt) with some stomachs."

Parvules

A new class of medicines (minute pills) designed for the administration of small doses for frequent repetition in cases of children and adults. It is claimed by some practitioners that small doses given at short intervals exert a more salutary effect. The elegance and efficiency of Parvules leave nothing to be desired. The dose of any of the Parvules will vary from one to four, according to age, or the frequency of their administration. For instance, one Parvule every hour, or two every two hours, or three every three hours, and so on for adults. For children, one three times a day is the minimum dose.

Ingluvin

The essential principle of the gizzard, and bearing the same relation to poultry that pepsin does to the higher animals. A powerful nitrogenous radical was (about 1850) discovered in the gizzard, which was shown by experiment to possess many of the properties of pepsin. Where the latter refuses to act, and where, in severe cases, it has even been rejected by the stomach, Ingluvin has effected relief rapidly and with ease. (Per oz. Bottle, 4s. 6d.)

Coca Liqueur

A powerful Tonic as well as a Sedative, acting upon the nervous and muscular systems. Although harm may be done by the abuse of Coca (as of other things), this need not deter the intelligent physician from availing himself of its advantages in controlling the alcohol, opium, and tobacco habits. The Liqueur Coca of Warner & Co. is prescribed in doses of one tablespoonful, frequently repeated.

Dialysed Iron

A solution containing the Basic Oxychloride of Iron, $Fe'''_2Cl_6 23F'''_2O_3$ —Purified by Dialysis. The instability of the preparation as generally found in the market has led us to experiment in its manufacture before supplying any under our name. The article we prepare will not precipitate or gelatinise, is neutral, of standard strength, and possesses all the properties of this valuable remedy.

☞ For the convenience of the patient, Warner & Co.'s Dialysed Iron is in 3-oz. vials, neatly boxed, and each box provided with a glass dropping tube. Physicians will please prescribe in this form, and that they may obtain a superior article, be careful to specify in all cases,

"WARNER & CO.'S" (Price 2s. 6d. per 3-oz. Bottle.)

Pill Vases

Of various sizes and patterns, with coloured and highly-finished labels. See Newbery's Catalogue for 1888 (500 pages). Free to *Chemists* on application.

Sugar-coated Pills

Unequalled in their medicinal properties or in SOLUBILITY, the best ingredients being invariably employed. W. R. Warner & Co. claim the art of Sugar-coating, which, while ensuring the adequate permanency of the coating, avoids the drying of the enclosed mass, so hard as to render it *insoluble* and *inert*. Each pill will produce the effects expected, and an experience of nearly thirty years, coupled with unremitting care and study, have enabled the manufacturers to achieve results otherwise unattainable.

DETAILED PRICE LIST

Mailed to Chemists and Merchants in any country, on application to—

F. NEWBERY & SONS (*Estab. A.D. 1746*),

1, KING EDWARD STREET, LONDON, E.C.

"THE MONTH."

Ecgonine and Artificial Cocaine.

It is known that in the extraction of cocaine from coca leaves that alkaloid is accompanied by other basic substances, which have to be removed before the cocaine is fit for use as a local anæsthetic. One of these bodies was recently described by Professor Liebermann as isotropyl-cocaine, because it was found to resemble cocaine in which isatropic acid had taken the place of the benzoic group (*Pharm. Journ.*, Sept. 29, p. 245). The opinion was then expressed that the other accompanying bases had probably a similar constitution, and this has been confirmed by the fact that they all readily yield ecgonine when decomposed by boiling with an acid. As these compounds form a considerable proportion of the basic product obtainable from coca leaves, it was thought possible that the ecgonine they contain might be utilized for conversion into cocaine, but the chief difficulty in the synthesis lay in the first stage, the want of a practical method for converting the ecgonine into benzoyl-ecgonine. This conversion Messrs. Liebermann and Giesel now report (*Berichte*, xxi., 3196) can be easily effected by adding gradually to a hot saturated solution of ecgonine in water rather more than an equivalent of benzoic anhydride, and digesting for an hour. The mixture is then shaken with ether to remove excess of benzoic anhydride and any benzoic acid formed, and the residue is washed on a filter with water, which removes unaltered ecgonine and leaves the less soluble benzoyl-ecgonine. This artificially prepared benzoyl-ecgonine has been proved to be identical in every respect with the natural benzoyl-ecgonine resulting from the decomposition of cocaine. The conversion of the benzoyl-ecgonine into cocaine, by the introduction of a methyl group, presents no difficulty, and the cocaine thus prepared corresponds in solubility, crystallization, melting point and all other characters with cocaine from coca leaves. Similarly, by treating ecgonine with cinnamic anhydride, Professor Liebermann has obtained cinnamyl-ecgonine, and this by the introduction of the methyl group was converted into "cinnamyl-cocaine" ($C_{19}H_{23}NO_4$), corresponding to cocaine with a cinnamyl group replacing the benzoyl group (*Berichte*, xxi., 3372). Cinnamyl-cocaine crystallizes readily; it is, like cocaine, almost insoluble in water, and soluble in alcohol, ether, acetone, choloform and benzol. It is thought probable that it occurs naturally in coca leaves, and that it is the basic constituent to which the odour of bitter almonds sometimes observed is due. The physiological action of the compound is under investigation. The practical synthesis of cocaine from ecgonine has also been effected by Messrs. Einhorn and Klein (*Berichte*, xxi., 3335), who reverse the mode of proceeding, and commence by converting the ecgonine into a methyl-ester. This they effect by passing a current of dry hydrochloric acid gas into a solution of ecgonine in methyl alcohol, and the ester is afterwards converted into cocaine, or as they term it "benzoylecgoninmethyl-ester," by digesting the hydrochloride with benzoyl chloride. By this method it is possible to prepare an entire series of new compounds, of which phenylacetyl ecgoninmethyl-ester, isovalerylecgoninmethyl-ester, and phtalyldiecgonindimethyl-ester are described. These compounds are being experimented with physiologically, but all that can be said at present is that the last mentioned acts similarly to cocaine.

Volatile Base in Ipecacuanha.

Whilst engaged in an investigation having for its object an improvement in the method of determining the amount of emetine in ipecacuanha, Herr Arndt has met with what he considers to be a second alkaloid in that drug (*Apot.-Zeit.*, Dec. 15, p. 1036). It was observed that during the distillation of a mixture of powdered ipecacuanha, potassium carbonate and ferric chloride with water, white crystals were deposited in the well-cooled condensing tube, while together with the water, which showed a strongly alkaline reaction, there passed over a heavy dense gas that readily dissolved in it. The aqueous solution was yellow, fluorescent, and had an ammoniacal odour. A mixture of 125 parts of powdered ipecacuanha, 50 of sodium carbonate, 10 of ferric chloride and 11 of water was then distilled for some hours in a continuous apparatus, after which the distillate was collected in a vessel containing hydrochloric acid, the distillate evaporated to 20 parts and redistilled with strong soda solution, when a colourless product was obtained having a strong odour of trimethylamine, pointing to the decomposition of an ammonium base. Upon repeating the experiment, and using barium hydrate instead of sodium hydrate in the redistillation, the base was separated from the hydrochloric acid compound and distilled over undecomposed and free from the trimethylamine odour. Upon spontaneous evaporation of a few drops of the distillate the base formed characteristic crystals occurring in rods and crosses, fluorescent at the edges, but otherwise colourless. The hydrochlorate formed finer octahedral crystals, fluorescent at the edges and smooth at the corners. It gave precipitates with platinum chloride, mercury potassioiodide, Nessler's reagent and solution of iodine. The nitrate resembled nitrate of emetine in not solidifying. Herr Arndt is satisfied that he was dealing with a volatile ammonium base existing already-formed in the drug, and not with a decomposition product of emetine. In fact, he says that when using potassium carbonate and ferric chloride he obtained a far larger yield of emetine from ipecacuanha root than by any other method. At present the yield of the new base has been small, varing between 0·3 and 0·5 per cent. of the weight of the root used, and no experiments have been made as to its physiological action.

Solubility of Emetine.

M. L. Julliard, in *L'Union Pharmaceutique* (p. 515), points out that discrepancies exist in the statements of different authors with regard to the solubility of emetine in ether, oils, etc. In order to ascertain the actual facts of the case, M. Julliard prepared some pure emetime by the exhaustion of ipecacuanha powder by chloroform with the addition of a tenth part of ammonia, decolorizing it by animal charcoal. He found that pure emetine is very soluble in ether and chloroform, and in oil of almonds by the aid of heat, but that it is insoluble in cold and in boiling water.

Ephedrine and Pseudo-ephedrine.

A few months since some details were published respecting the mydriatic action of ephedrine, the alkaloid separated by Professor Nagai from *Ephedra vulgaris*, var. *helvetica* (*Pharm. Journ.*, [3], xviii., 540). Want of material however appears to have

prevented hitherto the preparation of an adequate quantity of the base for commercial purposes. But from other species of *Ephedra* E. Merck has recently separated another alkaloid, to which the name "pseudo-ephedrine" has been given, and which is being experimented with physiologically by Professor Kobert. The hydrochlorate of "pseudo-ephedrine" is described as dissolving very readily in water and in alcohol, and crystallizing from a mixture of alcohol and ether in colourless needles or scales, which melt at 174° to 176° C.

Condurangin.

Another new compound mentioned in Merck's new catalogue is condurangin, a glucoside from condurango bark (*Gonolobus Condurango*, Triana), which is said to be a yellowish powder, soluble in alcohol and having an aromatic bitterish taste. It has not yet been used therapeutically, but in some preliminary physiological experiments by Professor Kobert it has been ascertained to be a powerful poison.

Scopoletin.

Scopoletin, the fluorescent body first separated by Professor Eykman from the root of *Scopolia japonica* (*Pharm. Journ.*, [3], xv., 81) and subsequently found in belladonna root by Kunz and Paschkis (*Pharm. Journ.*, [3], xvi., 365, 838), has been the subject of an investigation by Djuntaro Takahashi (*Apot.-Zeit.*, Nov. 24, p. 947). It was prepared by treating a dry alcoholic extract of the root with hydrochloric acid, mixing with sand and evaporating, and extracting the residue with chloroform, which left upon evaporation a semicrystalline paste that was purified by repeated crystallizations from absolute alcohol. Scopoletin so obtained consisted of colourless needles, melting at 198°-199° C., moderately soluble in alcohol, ether and chloroform, but very slightly soluble in water. It was found to be a phenol-like body, having the composition represented by the formula $C_{10}H_8O_4$, and upon introducing a methyl group instead of the replaceable hydroxyl group the product proved to be identical with dimethylesculetin. Monobrommethylscolopetin, when heated with KOH, yielded methylscopoletilic acid ($C_{11}H_{10}O_5$), the silver salt of which heated in a current of carbonic anhydride gave a colourless oil, having an agreeable odour. Upon making this strongly alkaline with NaOH and distilling it in a current of steam, there separated from the watery distillate insoluble dimethoxycumarin ($C_{10}H_{10}O_3$) melting at 58° C. and having an aromatic odour.

Pyrodin.

It seems desirable to emphasize the warning contained in the previous notice of this new compound, to the effect that under certain conditions its administration may be followed by symptoms of poisoning (*Pharm. Journ.*, [3], Dec. 1, p. 425). The *Lancet* (Dec. 15, p. 1195) referring to this subject says, "Notwithstanding the strongly worded caution which we published in our last issue against using this new drug, except in the most severe and critical cases, and even then in the smallest doses and at long intervals, we hear that it is being occasionally employed and causing grave and serious symptoms."

Oxygen.

Herr Göhring calls attention to the advantages presented by hydrogen peroxide over potassium chlorate as a means for the preparation of small quantities of oxygen (*Chem. Zeit.*, Dec 12, p. 1659). Commercial solutions usually contain about 3 per cent. of the peroxide, together with some acid added for the sake of stability. Sufficient ammonia should be added therefore to render the liquid slightly alkaline and then upon the addition of permanganate the oxygen is briskly evolved. A convenient apparatus consists of a flask fitted with a cork bearing a delivery tube and a drop-funnel. The flask is half filled with the solution; this is made alkaline, and after the cork has been fitted in a small quantity of permanganate solution is run in through the drop-filter. The evolution commences at once and goes on regularly and in this way 600 c.c. of 3 per cent. solution can be made to yield a litre of oxygen, which to be obtained chemically pure needs only to be washed with sulphuric acid and dried with calcium chloride. Should the evolution of gas stop prematurely it will recommence upon the addition of a little more permanganate solution, and the exhaustion of the hydrogen peroxide is indicated when a small quantity of liquid taken from the flask and acidulated with sulphuric acid shows the manganic red colour.

Creatine.

Although creatine has been known for upwards of a half-century and is one of the most constant constituents of muscle, its physiological action is still only partially understood, and many conflicting statements have been made as to its value in the economy and as a constituent of meat extracts. The question having been raised as to whether creatine can be administered beneficially as a remedy in affections of the stomach and bowels, the subject has been discussed by Professor Kobert in a communication to the *Chemiker-Zeitung* (Dec. 12, p. 1662). He is of opinion that creatine would be of therapeutic value when given in 0·1 gram doses four to six times daily for stimulating the power of muscular action in cases of debility, as well as in weakness of the heart and chronic weakness of the digestive organs. It should be given in the dry powder form, being laid upon the tongue and washed down with a draught of water. Professor Kobert adds that Liebig's meat extract, freed from salt, acts similarly, but that the gelatinous substances it contains are injurious in affections of the stomach.

Allyl Tribromide.

"Allyl tribromide" ($C_3H_5Br_3$) has been recently recommended strongly as a remedy for hooping-cough and also as being useful in the treatment of hysteria and asthma (*Pharm. Post*, Dec. 2, p. 780). In cases of hooping-cough it is administered internally in capsules containing about five drops, or injected subcutaneously. "Allyl tribromide" is described as being a colourless or faintly yellowish liquid at the ordinary temperature, but solidifying when cooled below 10° C. to a mass resembling a stearoptene, and having a specific gravity of 2·430. In the presence of the use of the name "allyl tribromide" for this compound it may be convenient to recapitulate briefly a portion of its history. In 1857 Wurtz described under the name "tribromide of allyl" a compound he had obtained by treating allyl iodide with bromine (*Ann. Chim. Phys.*, [3], li., 91). It was a colourless neutral liquid, having a specific gravity at 23° C. of 2·436, boiled at 217°-218°, and at a temperature below 10° C. became solid. These properties differed from those attributed by Berthelot and Luca to the isomeric "tribromhydrin," one of a series of compounds which they had prepared in the previous year by the action successively of phosphorus tri-

bromide and pentabromide upon glycerine (*Ann. Chim. Phys.*, [3], xlviii., 304), in which products one or more of the hydroxyls of the triatomic alcohol were replaced by bromine. Tribromhydrin was described by them as a heavy liquid, volatile at about 180° C., slowly decomposed by water and forming slightly on contact with air. Wurtz having obtained his "tribromide" by acting on an allyl compound, assumed that it differed from the glycerine derivative, and that in this instance the radicle allyl exercised a trivalent affinity. But in the light of subsequent investigations this appeared doubtful, and in 1870 Henry announced that Berthelot and Luca had been led into error by the impurity of their material in their description of tribromhydrin, and that pure tribromhydrin prepared from glycerine showed no difference in physical properties from Wurtz's tribromide of allyl obtained by treating allyl iodide (*Annalen*, civ. 368). This statement was challenged by Berthelot, but was reaffirmed by Henry after repeating his experiments, and allyl tribromide and tribromhydrin or tribrompropenyl are given as synonymous terms in the more recent chemical works. The modification which takes place in the monad allyl radical under the influence of the bromine may probably be represented graphically thus :—

CH_2	CH_2—
‖	|
CH	CH—
|	|
CH_2—	CH_2—
Allyl.	Propenyl or Glyceryl.

β-Napthol in Typhoid.

Seven cases of enteric fever treated with β-naphthol are reported upon by Mr. J. Michell Clarke, of the Bristol General Hospital (*Practitioner*, Dec., p. 421). The general results are considered to have shown that β-naphthol is a safe and tolerably efficient agent for the production of internal antisepsis, and that under its influence the duration of the disease is shortened, the intensity of the symptoms lessened, the tendency to splenic enlargement, albuminuria, boils and abscesses diminished, and the stools become much less offensive. On the other hand it may provoke so much gastric disturbance as to necessitate the discontinuance of its administration, and in two cases it failed to prevent a relapse. In four cases, two of which were boys twelve years of age, the drug was given in doses of 3¼ grains every two hours during the whole course of the disease, either in milk, or in a mixture flavoured with tincture of orange and syrup of lemon.

Thiol.

Under the name "thiol," or "German icthyol," an artificially prepared representative of the natural ichthyol now used to some extent in the treatment of skin disorders has been introduced (*Apot.-Zeit.*, Dec. 19, p. 1056). It is prepared by heating "gas oil," obtained in the distillation of brown coal, with 10 to 15 per cent. of flowers of sulphur at a temperature of 215° C., under which treatment the unsaturated hydrocarbons of the C_nH_{2n} and C_nH_{2n-2} series are attacked. The thiosulphonic acid formed is separated from the undecomposed oil and forms a dark brown resinous mass, readily soluble in water, from which it is reprecipitated by mineral acids or salts. It is soluble in alcohol and ether or better in a mixture of the two. By neutralization of an aqueous solution with ammonia or soda solution the corresponding salt of thiosulphonic acid is obtained, which is said to correspond to the corresponding combinations of the natural ichthyol. The sodium salt is represented as containing 12·1 per cent. of sulphur.

Paraamidobenzol Sulphinid.

Another compound, closely allied to saccharin, having an intensely sweet taste, has been described by Dr. Noyes (*Amer. Chem. Journ.*, viii., 167). This compound is paraamidobenzolsulphinid, having the constitution that may be represented by the formula—

$$C_6H_3\begin{cases} CO \\ SO_2 \\ NH_2 \end{cases}\!\!>NH_2$$

The compound may also be described as being a "saccharin" in which an atom of hydrogen is replaced by NH_2. It is difficultly soluble in water, and a hot saturated solution shows a deep blue fluorescence.

Phenacetin and Lactic Acid.

Incidental mention was made recently of the solubility of phenacetin in lactic acid at a temperature of 33° C., and of the suggestion of Messrs. Mirrachi and Raffi that its rapid absorption when administered, notwithstanding its comparative insolubility, is due to the occurrence of lactic acid in the stomach (*Pharm. Journ.*, Nov. 24, p. 409). It is now further suggested (*Pharm. Zeit.*, Dec. 15, p. 753) that the failure sometimes of the compound to produce the expected relief from neuralgia or headache, may be due to the absence of that acid from the stomach and the consequent imperfect absorption of the phenacetin, the inference being that the difficulty might be overcome by the addition of a little lactic acid.

Camphoric Acid.

Camphoric acid has been recently strongly recommended by Professor Reichert as useful in the treatment of acute and chronic affections of the respiratory passages. Externally he has used solutions containing from ½ to 6 per cent. of the acid, and has observed that when applied to the mucous membrane it appears to exercise a constringent action within two minutes, and that, besides its antiseptic properties, it promotes granulation without irritation. He recommends in acute angina the use of a ½ to 1 per cent. solution every three hours ; in pharyngo-laryngitis and tracheitis the application as a spray of a ¼ per cent. solution, increasing in strength to 1 per cent. ; in acute catarrh the introduction of wadding saturated with 2 per cent. solution into the nose ; in acute bronchitis a 1 to 2 per cent. solution applied as a spray to the larynx. Camphoric acid forms white crystalline needles, having an acid taste ; it is difficultly soluble in water, and readily soluble in alcohol, ether or fixed oils (2 per cent.). In order to prevent it from crystallizing out from concentrated aqueous solutions, it is advisable to add about 11 per cent. of alcohol.

Glycerine in Infantile Diarrhœa.

The usefulness of rectal injections of glycerine in relieving constipation has been recently widely recognized, and now Mr. George Rice states that he has found them equally valuable in the treatment of children in cases of simple diarrhœa and prolapse (*Practitioner*, Dec., p. 418). The quantity of glycerine administered was two drachms and usually marked improvement followed at once after the first injection. In reference to the use of rectal injections of glycerine Dr. Grewcock writes

(*Brit. Med. Journ.*, Dec. 22, p. 1424), that if a piece of cotton-wool, the size of a nut, is well saturated with glycerine and inserted as a suppository, in a short time a copious motion is produced.

Strychnine in Narcotic Poisoning.

The hypodermic injection of strychnine in cases of opium narcosis, or in any case of narcotic poisoning where there occurs any irregularity or interruption of the breathing that appears to threaten a failure of the respiratory centre, is strongly recommended by Dr. G. A. Gibson (*Practitioner*, Dec., p. 401). The administration of alcoholic stimulants he objects to, and he emphatically condemns the method of keeping the patient awake by making him walk about.

Eugenia Jambolana.

Mr. G. Mahomed, of Bournemouth, describes a case of diabetes (*Practitioner*, p. 416), in which the use of this recently introduced drug appeared to be attended with considerable success. He remarks that the patient suffered from cerebral excitement during the time that he was afflicted by diabetes, and that the drug had the effect of causing depression, which he thinks may be due to the action of the drug on the vaso-motor centres.

Calomel and Iodides.

The dusting of the eye with calomel during the internal administration of iodine, according to Dr. Rabl, is liable to prove injurious (*Münch. med. Wochenschr.*, Dec. 18, p. 899). Even when the quantity does not exceed a gram of potassium iodide daily it is said to lead to the formation of mercuric iodide, which exercises a caustic action on the conjunctiva. It is suggested that the difficulty might be avoided by the use of a syrup of iodide of iron containing a deficiency of iodine.

Diastase.

The effect upon the fermentative properties of pure diastase of minute quantities of acids and salts has been the subject of a communication by Herr Kiawkow (*Chem. Zeit.*, Dec. 12, p. 1660). He states that the addition of no more than 0·0002 per cent. of hydrochloric, sulphuric or nitric acid was found sufficient to paralyse the diastatic action of the ferment, and that its property of acting upon starch was not restored by neutralization with sodium carbonate. Of the organic acids, 0·002 per cent. of acetic or lactic acid was sufficient to paralyse the action of the ferment. Alkalies only retarded the action of diastase, without destroying it, even when as much as 5 per cent. of sodium carbonate was added. Experiments were also made with chlorides, nitrates and sulphates of the alkalies and it was found that the greatest amount of retardation was exercised by sodium chloride. Further it was ascertained that in the diastatic process albumen, globulin and peptone exercise a remarkable protective property against the depressing action of acids upon diastase, even an inconsiderable quantity of albumenoid being sufficient for the purpose.

Vegetable Fats.

The composition of a number of vegetable fats forms the subject of a communication by Herr Jacobson (*Zeits. f. physiolog. Chemie*, vol. xiii., p. 32). The fat from the "hog-bean" contains only a small quantity of volatile fat acid, the odour of which points to valerianic acid. The crude fat contains 76 per cent. of oleic acid and 11·5 per cent. of solid fat acids, consisting for the most part of palmitic acid. The presence of lecithin and cholesterin was in addition detected. The fat from vetch seeds also contains only a small quantity of volatile fat acids, together with lecithin and cholesterin. In pea fat the volatile fat acids are present in somewhat greater quantity than in the two previously mentioned. Besides lecithin and cholesterin there is also another body present, having a lower melting-point, which appears to be ceryl alcohol. The solid fat acids consists almost entirely of palmitic acid, with a small quantity of an acid melting at 74° to 75° C. Lupin fat contains a small quantity of volatile fat acids, lecithin, a large quantity of cholesterin and the same alcohol (ceryl alcohol) as was found in pea fat. The solid fat acids consist chiefly of palmitic acid, with a little arachic acid.

Cotton-seed Oil in Olive Oil and Lard.

A test for the presence of cotton-seed oil in olive oil has been published by Dr. Hirschsohn, which consists in well mixing 3 to 5 c.c. of the oil with 6 to 10 drops of a solution of crystallized gold chloride in 200 c.c. of chloroform, and standing the containing test tube in a beaker full of boiling water for about twenty minutes. If the olive oil be pure, there will be no development of a rose colour through the reduction of the gold salt (*Pharm. Zeit. f. Russl.*, Nov. 13, p. 721). Dr. Biel proposes to apply this test also for the detection of cotton-seed oil in lard, using 5 or 6 drops of the gold solution to 5 grams of the lard, and heating in a water-bath. At the end of twenty minutes, if the lard be pure, the mixture will be still colourless; but if cotton-seed oil be present, it will be of a rose to a red colour, and greenish when seen by transmitted light (*Pharm. Zeit.*, Dec. 15, p. 753.)

Forsteronia floribunda.

The December number (24) of the *Kew Bulletin* contains an interesting note on the india-rubber obtainable from *Forsteronia floribunda*, which is stated by Mr. D. Morris to be called in Jamaica the "milk wythe," or milk vine. The juice of this plant examined by the chemist to the Silvertown India-rubber, Gutta-percha and Telegraph Works Co. is stated to yield about one pound of washed and dried caoutchouc, or 22 ounces of the crude article per quart of juice. In colour and strength it approaches more nearly to the better descriptions of Para rubber. It vulcanizes perfectly when treated with sulphur, the product being of light colour, solid, firm and strong.

Copaifera Gorshiana.

The *Kew Bulletin* also contains a *résumé* of what is known of the tree yielding Inhambane copal, an account of which was published in the *Journ. Linn. Soc.* (vol. xx., p. 406). It is satisfactory to learn that some seeds sent to Kew in February, 1886, have germinated, and that the plant has been introduced into India, Fiji, Singapore, Jamaica, Trinidad, Demerara, Tropical Australia and Dominica. The tree not only yields the fragrant Inhambane copal, but is a forest giant, towering above the surrounding forest in its native country, and yielding valuable timber.

Dialium nitidum.

The fruit of *Dialium nitidum*, a small African leguminous tree, has been examined by Professor Heckel, who finds it to contain tartaric acid, bitartrate of potash, tannin, glucose and colouring matter. It is eaten by the negroes in Western Africa, and approaches in character the fruits of the baobab in possessing cooling and antifebrile properties. In

the Mandingo language it is called "solomé," but is also called in other dialects solom or sorom, kocito, monké and méka (*Rép. de Pharm.*, p. 41).

Poisoning by Laburnum.

A case of poisoning by laburnum pods is recorded (*Brit. Med. Journ.*, Dec. 15, p. 1336), in which the patient recovered after the use of a mustard emetic and the subsequent administration of stimulants. The pupils of the eye were contracted, but convulsions were not produced.

Gum Reservoirs in Rhamnaceæ.

In a paper read before the Société Botanique de France (*Bulletin*, p. 325), Messrs. Guignard and Colin point out that in certain Rhamnaceous species cells or receptacles of gum or mucilage are found analogous to those met with in the *Malvaceæ* and *Tiliaceæ*. They occur in the genera *Rhamnus*, *Hovenia*, *Ceanothus*, *Paliurus*, *Zizyphus* and *Gouania*, but not in *Berchemia*, *Sarcomphalus*, *Alphitonia*, *Colubrina*, *Phylica*, *Noltia*, *Pomaderris*, *Colletia*, *Cryptandra*, *Trevoa*, etc. The distribution of these gum cells is somewhat unequal in different species, *R. Frangula* and *R. californica* possessing them in stem, leaf, flower and fruit, whilst they occur in the leaf only in *R. cathartica* and *R. infectoria*, and in some other species of the genus have not been detected at all. Their presence is easily recognized under the microscope by the use of tincture of hæmatoxylin, which gives a bright colour to their contents. The gum receptacles often become flattened in the bark, especially in the older bark, and might escape notice if not thus submitted to a colour test. In the pith, however, they retain their shape, and sometimes increase in size so as to become visible to the naked eye. The authors point out that the occurrence of the gum receptacles, added to the abundance of oxalate of lime crystals in the inner bark, the sclerogenous deposits in the pericycle, and the often stratified nature of the secondary liber, communicate to these plants a very characteristic structure.

FERMENTS AND FERMENTATION.*

BY W. T. THISELTON DYER, C.M.G., M.A., B.SC., F.R.S., F.L.S.

There is no part of the field of physiological botany which has yielded results of more interest and importance than that which relates to the action of ferments and fermentation; and I could hardly give a better illustration of the purely biological method of treating it. I believe that these results, wonderful and fascinating as they are, afford but a slight indication of the range of those that are still to be accomplished. The subject is one of extreme intricacy, and it is not easy to speak about it briefly. To begin with, it embodies two distinct groups of phenomena which have in reality very little which is essential in common.

What are usually called ferments are perhaps the most remarkable of all chemical bodies, for they have the power of effecting very profound changes in the chemical constitution of other substances, although they may be present in very minute quantity; but, which is their most singular and characteristic property, they themselves remain unchanged in the process. It may be said without hesitation that the whole nutrition of both animals and plants depends on the action of ferments. The organism is incapable of using solid nutrient matter for the repair and extension of its tissues; it must be first brought into a soluble form before it can be made available, and this change is generally brought about by the action of a ferment. Animal physiology has long been familiar with the part played by these bodies, and it may be said that no small part of the animal economy is made up of organs required either for the manufacture of ferments or for the exposure of ingested food to their action. It may seem strange at first sight to speak of analogous processes taking place in plants. But it must be remembered that plant nutrition includes two very distinct stages. Certain parts of plants build up, as everyone knows, from external inorganic materials substances which are available for the construction of new tissues. It might be supposed that these are used up as fast as they are formed. But it is not so; the life of the plant is not a continuous balance of income and expenditure. On the contrary, besides the general maintenance of its structure, the plant has to provide from time to time for enormous resources to meet such exhausting demands as the renewal of foliage, the production of flowers, and the subsequent maturing of fruit.

In such cases the plant has to draw on an accumulated store of solid food which has rapidly to be converted into the soluble form in which alone it is competent to be drawn off through the tissues to the seat of consumption. And I do not doubt for my part that in such cases ferments are brought into play of the same kind and in the same way as in the animal economy. Take such a simple case as a potato tuber. This is a mass of cellular tissue, the cells of which are loaded with starch. We may either dig up the tuber and eat the starch ourselves or we may leave it in the ground, in which case it will be consumed in providing material for the growth of a potato-plant next year. But the processes by which the insoluble starch is made available for nutrition are, I cannot doubt, closely similar in either case.

When we inquire further about these mysterious and all-important bodies, the answer we can give is extremely inadequate. It is very difficult to obtain them in amount sufficient for analysis or in a state of purity. We know, however, that they are closely allied to albuminoids and contain nitrogen in varying proportion. Papain, which is a vegetable ferment derived from the fruit of the papaw, and capable of digesting most animal albuminoids, is said to have the same ultimate composition as the pancreatic ferment and of peptones, bodies closely allied to proteids; the properties of all three bodies are, however, very different. It seems clear, nevertheless, that ferments must be closely allied to proteids, and, like these bodies, they are, no doubt, directly derived from protoplasm.

I need not remind you that, unlike other constituents of plant tissues, protoplasm, as a condition of its vitality, is in a constant state of molecular activity. The maintenance of this activity involves the supply of energy, and this is partly derived from the waste of its own substance. This "self-decomposition" of the protoplasm liberates energy; and in doing so gives rise to a number of more stable bodies than protoplasm. Some of these are used up again in nutrition; others are thrown aside and are never drawn again into the inner circle of vital processes. In the animal organism, where the strictest economy of bulk is a paramount necessity, they are promptly got rid of by the process of excretion. In the vegetable economy these residual products usually remain. And it is for this reason, I may point out, that the study of the chemistry of plant nutrition appears to me of such immense importance. The record of chemical change is so much more carefully preserved; and the probability of our being able to trace the changes it has followed is consequently far more likely to be attended with success.

This preservation in the plant of the residual by-

* Extract from the Presidential Address to the Biological Section of the British Association, at Bath.

products of protoplasmic activity no doubt accounts for the circumstance which otherwise is extremely perplexing—the profusion of substances which we meet with in the vegetable kingdom to which it is hard to attribute any useful significance. It seems probable that ferments, in a great many cases, belong to the same category. I imagine that it is in some degree accidental that some of them have been made use of, and thus the plant has been able to temporarily lock up accumulations of food to be drawn upon in future phases of its life with the certainty that they would be available. Without the ferments the key of the store-house would be lost irretrievably.

Plants, moreover, are now known to possess ferments, and the number will doubtless increase, to which it is difficult to attribute any useful function. Papain, to which I have already alluded, abounds in the papaw; but it is not easy to assign to it any definite function; still less is it easy, on teleological grounds, to account for the rennet ferment contained in the fruits of an Indian plant, *Withania coagulans*, and admirably investigated by Mr. Sheridan Lea.

Having dwelt so far on the action of ferments, we may now turn to fermentation and that other kind of change in organic matter called "putrefaction," which is known to be closely allied to fermentation. Ferments and fermentation, as I have already remarked, have very little to do with one another; and it would save confusion and emphasize the fact if we ceased to speak of ferments, but used some of the alternative names which have been proposed for them, such as *zymases* or *enzymes*.

The classical case of fermentation, which is the root of our whole knowledge of the subject, is that of the conversion of sugar into alcohol. Its discovery has everywhere accompanied the first stages of civilisation in the human race. Its details are now taught in our text-books; and I should hardly hope to be excused for referring to it in any detail if it were not necessary for my purpose to draw your attention more particularly to one or two points connected with it.

Let us trace what happens in a fermenting liquid. It becomes turbid, it froths and effervesces, the temperature sensibly increases; this is the first stage. After this it begins to clear, the turbidity subsides as a sediment; the sugar which the fluid at first contained has in great part disappeared, and a new ingredient, alcohol, is found in its place.

It is just fifty years ago that the great Dutch biologist Schwann made a series of investigations which incontrovertibly demonstrated that both fermentation and putrefaction were due to the presence of minute organisms which live and propagate at the expense of the liquids in which they produce as a result these extraordinary changes. The labours of Pasteur have confirmed Schwann's results, and—what could not have been foreseen—have extended the possibilities of this field of investigation to those disturbances in the vital phenomena of living organisms themselves which we include under the name of "disease," and which, no one will dispute, are matters of the deepest concern to every one of us.

Now, at first sight, the conversion of starch into sugar by means of diastase seems strikingly analogous to the conversion of sugar into alcohol. It is for this reason that the phenomena have been so long associated. But it is easy to show that they are strikingly different. Diastase is a chemical substance, of obscure composition, it is true, but inert and destitute of any vital properties, nor is it affected by the changes it induces. Yeast, on the other hand, which is the active agent in alcoholic fermentation, is a definite organism; it enormously increases during the process, and it appears to me impossible to resist the conclusion that fermentation is a necessary concomitant of the peculiar conditions of its life. Let me give you a few facts which go to prove this. In the first place, you cannot ferment a perfectly pure solution of sugar. The fermentible fluid must contain saline and nitrogenous matters necessary for the nutrition of the yeast protoplasm. In pure sugar the yeast starves. Next, Schwann found that known protoplasmic poisons, by killing the yeast-cells, would prohibit fermentation. He found the same result to hold good of putrefaction, and this is the basis of the whole theory of antiseptics. Nor can the action of yeast be attributed to any ferment which the yeast secretes. It is true that pure cane-sugar cannot be fermented, and that yeast effects the inversion of this, as it is called, into glucose and lævulose. It does this by a ferment which can be extracted from it, and which is often present in plants. But you can extract nothing from yeast which will do its peculiar work apart from itself. Helmholtz made the crucial experiment of suspending a bladder full of boiled grape-juice in a vat of fermenting must; it underwent no change; and even a film of blotting-paper has been found a sufficient obstacle to its action. We are driven, then, necessarily to the conclusion that in the action of "ferments" or zymases we have to do with a chemical—*i.e.*, a purely physical process; while in the case of yeast we encounter a purely physiological one.

How, then, is this action to be explained? Pasteur has laid stress on a fact which had some time been known, that the production of alcohol from sugar is a result of which yeast has not the monopoly. If ripening fruits, such as plums, are kept in an atmosphere free from oxygen, Bérard found that they, too, exhibit this remarkable transformation; their sugar is converted appreciably into alcohol. On the other hand, Pasteur has shown that, if yeast is abundantly supplied with oxygen, it feeds on the sugar of a fermentible fluid without producing alcohol. But, under the ordinary circumstances of fermentation, its access to oxygen is practically cut off; the yeast, then, is in exactly the same predicament as the fruit in Bérard's experiment. Sugar is broken up into carbon dioxide and alcohol in an amount far in excess of the needs of mere nutrition. In this dissociation it can be shown that an amount of energy is set free in the form of heat equal to about one-tenth of what would be produced by the total combustion of an equivalent amount of grape-sugar. If the protoplasm of the yeast could, with the aid of atmospheric oxygen, completely decompose a unit of grape-sugar, it would get ten times as much energy in the shape of heat as it could get by breaking it up into alcohol and carbon dioxide. It follows, then, that to do the same amount of growth in either case, it must break up ten times as much sugar without a supply of oxygen as with it. And this throws light on what has always been one of the most remarkable facts about fermentation—the enormous amount of change which the yeast manages to effect in proportion to its own development.

There are still two points about yeast which deserve attention before we dismiss it. When a fermenting liquid comes to contain about 14 per cent. of alcohol, the activity of the yeast ceases, quite independently of whether the sugar is used up or not. In other cases of fermentation the same inhibiting effect of the products of fermentation is met with. Thus lactic fermentation soon comes to an end unless calcium carbonate or some similar substance be added, which removes the lactic acid from the solution as fast as it is formed.

The other point is that in all fermentations, besides what may be termed the primary products of the process, other bodies are produced. In the case of alcoholic fermentation the primary bodies are alcohol and carbon dioxide; the secondary, succinic acid and glycerine. Delpino has suggested that these last are residual products derived from that portion of the

fermentible matter which is directly applied to the nutrition of the protoplasm.

Yeast, itself the organism which effects the remarkable changes on which I have dwelt, is somewhat of a problem. It is clear that it is a fungus, the germs of which must be ubiquitous in the atmosphere. It is difficult to believe that the simple facts, which are all we know about it, constitute its entire life history. It is probably a transitory stage of some more complicated organism.

I can only briefly refer to putrefaction. This is a far more complex process than that which I have traced in the case of alcoholic fermentation. In that nitrogen is absent while it is an essential ingredient in albuminoids, which are the substances which undergo putrefactive changes. But the general principles are the same. Here, too, we owe to Schwann the demonstration of the fact that the effective agents in the process are living organisms. If we put into a flask a putrescible liquid such as broth, boil it for some time, and during the process of boiling plug the mouth with some cotton-wool, we know that the broth will remain long unchanged, while if we remove the wool putrescence soon begins. Tyndall has shown that, if we conduct the experiment on one of the high glaciers of the Alps, the cotton-wool may be dispensed with. We may infer, then, that the germs of the organisms which produce putrefaction are abundant in the lower levels of the atmosphere and are absent from the higher. They are wafted about by currents of air; but they are not imponderable, and in still air they gradually subside. Dr. Lodge has shown that air is rapidly cleared of suspended dust by an electric discharge, and this, no doubt, affords a simple explanation of the popular belief that thunderous weather is favourable to putrefactive changes.

Cohn believes that putrefaction is due to an organism called *Bacterium Termo*, which plays in it the same part that yeast does in fermentation. This is probably too simple a statement; but the general phenomena are nevertheless similar. There is the same breaking down of complex into simpler molecules; the same evolution of gas, especially carbon dioxide; the same rise of temperature. The more or less stable products of the process are infinitely more varied, and it is difficult, if not impossible, to say, in the present state of our knowledge, whether in most cases they are the direct outcome of the putrefactive process, or residual products of the protoplasmic activity of the organisms which induce it. Perhaps, on the analogy of the higher plants, in which some of them also occur, we may attribute to the latter category certain bodies closely resembling vegetable alkaloids; these are called ptomaines, and are extremely poisonous. Besides such bodies, bacteria undoubtedly generate true ferments and peculiar colouring matters. But there are in most cases of putrefaction a profusion of other substances, which represent the various stages of the breaking up of the complex proteid molecule, and are often themselves the outcome of subsidiary fermentations.

These results are of great interest from a scientific point of view. But their importance at the present moment in the study of certain kinds of disease can hardly be exaggerated. I have already mentioned Henle as having first found the true clue to animal histology in the structure of plants. As early as 1840 the same observer indicated the argument for regarding contagious diseases as due to living organisms. I will state his argument in the words of De Bary, whose "Lectures on Bacteria," the last work which we owe to his gifted hand, I can confidently recommend to you as a luminous but critical discussion of a vast mass of difficult and conflicting literature.

It was, of course, clear that contagion must be due to the communication of infectious particles or contagia. These contagia, although at the time no one had seen them, Henle pointed out, "have the power, possessed, as far as we know, by living creatures only, of growing under favourable conditions, and of multiplying at the expense of some other substance than their own, and therefore of assimilating that substance." Henle enforced his view by comparison with the theory of fermentation, which had then been promulgated by Schwann. But for many years his views found no favour. Botanists, however, as in so many other cases, struck on the right path, and from about the year 1850 steady progress, in which De Bary himself took a leading part, was made in showing that most of the diseases of plants are due to parasitic infection. The reason of this success was obvious: the structure of plants make them more accessible to research, and the invading parasites are larger than animal contagia. On the animal side all real progress dates from about 1860, when Pasteur, having established Schwann's theory of fermentation on an impregnable basis, took up Henle's theory of living contagia.

The only risk now is that we may get on too fast. To put the true theory of any one contagious disease on as firm a basis as that of alcoholic fermentation is no easy matter to accomplish. But I believe that this is, notwithstanding a flood of facile speculation and imperfect research, slowly being done.

There are two tracts in the body which are obviously accessible to such minute organism as bacteria, and favourable for their development. These are the alimentary canal and the blood. In the case of the former there is evidence that every one of us possesses quite a little flora of varied forms and species. They seem for the most part, in health, to be comparatively innocuous; indeed, it is believed that they are ancillary to and aid digestion. But it is easy to see that other kinds may be introduced, or those already present may be called into abnormal activity, and fermentative processes may be set up of a very inconvenient kind. These may result in mere digestive disorder, or in the production of some of those poisonous derivatives of proteids of which I have spoken, the effect of which upon the organism of the part may be most disastrous.

The access of bacteria to the blood is a far more serious matter. They produce phenomena the obvious analogy of which to fermentative processes has led to the resulting diseases being called zymotic. Take, for example, the disease known as "relapsing fever." This is contagious. After a period of incubation, violent fever sets in, which lasts for something less than a week, is then followed by a period of absence, to be again followed in succession by one or more similar attacks, which ultimately cease. Now you will observe that the analogy to a fermentative process is very close. The period of incubation is the necessary interval between the introduction of the germ and its vegetative multiplication in sufficient numbers to appreciably affect the total volume of the blood. The rise in temperature and the limited duration of the attack are equally, as we have seen, characteristic of fermentative processes, while the bodily exhaustion which always follows fever is the obvious result of the dissipation by the ferment organisms of nutritive matter destined for the repair of tissue waste. During the presence of this fever there is present in the blood an organism, *Spirochæte Obermeieri*, so named after its discoverer. This disappears when the fever subsides. It is found that if other individuals are inoculated with blood taken from patients during the fever attack, the disease is communicated, but that this is not the case if the inoculation is made during the period of freedom. The evidence then seems clear that this disease is due to a definite organism. The interesting point, however, arises, why does the fever recur, and why eventually cease? The analogy of fermentation leads to the hypothesis that, as in the case of yeast, the products

of its action inhibit after a time the further activity of the *Spirochæte*. The inhibiting substance is, no doubt, eventually removed partially from the blood by its normal processes of depuration, and the surviving individuals of *Spirochæte* can then continue their activity, as in lactic fermentation. With regard to the final cessation of the disease, there are facts which may lead one to suppose that in this as in other cases sufficient of the inhibiting substance ultimately remains in the organism to protect it against any further outbreak of activity on the part of the *Spirochæte*.

Here we have an example of a disease which, though having a well-marked zymotic character, is comparatively harmless. In anthrax, which is known to be due to *Bacillis subtilis*, we have one which is, on the contrary, extremely fatal. I need not enter into the details. It is sufficient to say that there is reason to believe that the *Bacillus* produces, as one of those by-products of protoplasmic destruction to which I have already alluded, a most virulent poison. But the remarkable thing is that this *Bacillus*, which can be cultivated externally to the body, if kept at a heightened temperature, can be attenuated in its virulence. It drops, in fact, the excretion of the poison. It is then found that, if injected into the blood, it does no mischief, and, what is more extraordinary, if the *Bacillus* in its most lethal form is subsequently introduced, it too has lost its power. The explanation of the immunity in this case is entirely different to that which was suggested by a consideration of the facts of relapsing fever. The researches of Metschnikoff have led to the hypothesis that in the present case the white blood-corpuscles destroy the *Bacillus*. When they first come into contact with these in their virulent form they are unable to touch them. But if they have been educated by first having presented to them the attenuated form, they find no difficulty in grappling with the malignant. This a very remarkable view. I should not have put it before you had there not been solid reasons for regarding the idea of the education of protoplasm with scientific respect. The plasmodia of the myxomycetes, which consist of naked protoplasm, are known to become habituated to food which they at first reject, and the researches of Beyerinck on the disease known as "gumming" in plants have apparently shown that healthy cells may be taught, as it were, to produce a ferment which otherwise they would not excrete.

If Metschnikoff's theory be true, we have a rational explanation of vaccination and of preventive inoculation generally. It is probably, however, not the only explanation. And the theory of the inhibitive action upon itself of the products of the ferment-organism's own activity is still being made the basis of experiment. In fact, the most recent results point to the possibility of obtaining protection by injecting into the blood substances artificially obtained entirely independent of the organisms whose development they inhibit.

It is impossible for me to touch on these important matters at any greater length, but I doubt if the theory of fermentation, as applied to the diseases of organisms, has as yet more than opened its first page. It seems to me possible that, besides the rational explanation of zymotic diseases, it may throw light on others where, owing to abnormal conditions, the organism, as in the case of Bérard's plants, is itself the agent in its own fermentative processes.

And now I must conclude. I have led you, I am afraid, a too lengthy and varied a journey in the field of botanical study. But to sum up my argument. I believe I have shown you that at the bottom of every great branch of biological inquiry it has never been possible to neglect the study of plants; nay, more, that the study of plant life has generally given the key to the true course of investigation. Whether you take the problems of geographical distribution, the most obscure points in the theory of organic evolution, or the innermost secrets of vital phenomena, whether in health or disease, not to consider plants is still, in the words of Mr. Darwin, "a gigantic oversight, for these would simplify the problem."

ON THE TEES SALT INDUSTRY.*

BY T. W. STUART.

Until recently the alkali manufacturers of the Tyne obtained the whole of their salt supplies from Cheshire, from whence the high cost of transit placed them, in this respect, at a considerable disadvantage as compared with those manufacturers whose works are situated in Lancashire. The rapid development of the salt industry on the Tees of late years, resulting in a substantial reduction in the price of salt on the Tyne, constitutes an important boon to the alkali manufacturers of this district. This reduction in the cost of salt has come to the manufacturers in this district at a time when the competition between the Leblanc and ammonia-soda processes has been most severely felt, and when a considerable reduction in the cost of production by the Leblanc process was urgently required. The discovery, therefore, of the bed of rock salt at Middlesbro', and the development of the most approved mode of winning it, have proved of great importance to the soda industry on the Tyne.

When the British Association met at Newcastle in 1863, the discovery of salt at Middlesboro' was announced, and the early commencement of a new industry in the form of salt manufacture as an addition to the industries on the Tees was fully anticipated. Messrs Bolckow and Vaughan commenced boring for water in their works in 1859, with the view of obtaining the supply for their boilers and for other purposes, and continued boring till 1862, when, at a depth of 1200 feet, a bed of rock salt, 100 feet thick, was discovered. They endeavoured to win the salt by sinking a shaft shortly after, in order to work the mineral by a regular system of mining, but the influx of water was so great that the undertaking was ultimately abandoned. Nothing more was done to develop the deposits till 1874, when Messrs. Bell Bros. sank a borehole in the land adjoining their iron-works at Port Clarence on the north side of the Tees, where they found the bed of rock salt at a depth of 1127 feet and 65 feet thick. Deterred by the experience of Messrs. Bolckow and Vaughan, who had expended a large sum of money in their attempt to win the salt by mining, Messrs. Bell Bros. allowed the question to rest in abeyance till 1881, when, at the suggestion of Mr. Thomas Bell, they adopted the plan in operation at Nancy in the east of France, but of which he had then no knowledge, and in the following year, 1882, they commenced the manufacture of salt at Port Clarence. Messrs. Bell Bros. were, therefore, the pioneers of this new and important industry. Some time afterwards, Messrs. Bolckow, Vaughan and Company, Limited, commenced operations at Middlesbro' and at Eston, while the Newcastle Chemical Works Company, Limited, and the Haverton Hill Salt Company—now the South Durham Salt Company, Limited—established works on the north side of the river. In 1886, Messrs. C. Tennant and Partners, Limited, and the Jarrow Chemical Company, Limited, jointly erected works at Haverton Hill to supply the alkali works on the Tyne, the Newcastle Chemical Works Company, Limited, having established their works with the same object.

The bed of rock salt has been proved to exist over an area rather more than four miles long by $2\frac{3}{4}$ miles broad, or about 12 square miles, and allowing for its known unequal thickness, each square mile is esti-

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mated to contain 100,000,000 tons of salt. This not only proves the large extent of the deposit, but also dispels any anxiety for the future of the Tees salt industry.

The most northerly borehole is at Greatham, where the salt was found at a depth of 889 feet from the surface; the most southerly at North Ormesby, in Yorkshire, a distance of rather over 4 miles, where the bed is 1,340 feet from the surface. The borehole at the eastern extremity is at Eston, at a depth of 1,563 feet, and the most westerly at Haverton Hill, a distance of about $2\frac{3}{4}$ miles, at a depth of 797 feet, from which it will be seen that the bed dips to the south and east. The borehole at Greatham is at present the most northern in which the salt bed has been proved, and it has recently been ascertained by a borehole at Seaton Carew that the bed disappears between Greatham and that point.

The thickness of the bed of rock salt is variable, but the average of the wells in operation may be taken at 80 to 90 feet.

It is impossible to give an analysis showing the average composition of the rock salt, as it contains a considerable quantity of earthy matter distributed in layers throughout its mass. Its variable composition, however, has been demonstrated by the examination of many samples, which have been found to contain from 40 per cent. up to 98 per cent. sodium chloride. In actual working this earthy matter is left in the cavity of the well when the salt is dissolved, and causes no inconvenience, unless in time it may cover the surface of the rock salt, and to some extent impede the action of the water in forming the brine.

In the rocks, passed through in boring No. 1 well, at the works of Messrs. Tennant and Jarrow Chemical Company, Haverton Hill, there is first about 83 feet of soil, sand, clay, etc., which is succeeded by a bed of water-bearing red sandstone, 500 feet thick, containing thin seams of marl. From this very thick bed of sandstone an inexhaustible supply of water is obtained, and from which all the brine on the Tees is produced, as will be more fully explained when the working of the brine wells is described. Below the sandstone there is a bed of red marl about 300 feet thick, containing thin beds of sandstone and veins of gypsum, then 9 feet of anhydrite, and immediately above the bed of rock salt, 23 feet of saliferous marls, known as "Rotten Marls," which have given great trouble to the salt manufacturers by falling into the cavity formed by the removal of the salt, and destroying the lining and suction tubes of the wells. The rock salt at this point is 928 feet from the surface, and 73 feet thick; and below this there are thin beds of hard stone, gypsum, etc. With the view of ascertaining the presence of coal, of which 5,000,000 tons are annually consumed in and near Middlesbro', Messrs. Bell Bros. continued the boring in one instance to 250 feet below the salt, when they found gypsum, magnesium limestone, then limestone, and again gypsum, and rock salt interstratified with marl, and in a bed of rock salt were obliged to stop. The presence of this magnesium limestone lent colour to the belief that the coal might be below, but when they found small beds of salt it was clear that they had still the prospect of great thickness of red sandstone to pierce, and the diameter of the bore having been reduced to 1 inch, they were compelled to desist at 1,355 feet from the surface. At 1,313 feet, and while in the limestone, they found considerable quantities of gas evolved, of which the following is the analysis:—

Methane or marsh gas, CH_4 . .	76·9
Ethane, C_2H_6	6·3
Nitrogen, N	16·8—100·0

In the Seaton Carew boring it was proved that the salt did not exist, and magnesium limestone was reached at 522 feet. While proceeding further in this borehole in search of coal, the thickness of magnesium limestone passed through was 878 feet, and which is said to be the thickest section of this strata yet reached.

Of the fourty-seven holes that have been bored, the Cumberland Diamond Boring Company, who had a monopoly of this work, have bored about thirty-two. By this system of boring a hollow cylinder 18 feet long with diamonds firmly fixed at the bottom edge, called the "crown," is driven by steam power, and made to rotate on the rock being drilled through, while water is run down the boring at the same time. When a core of sufficient length is cut in this manner it is brought up, and the operation repeated till the hole is bored to the required depth, and a core representing the entire section of the rocks passed through is produced, either for inspection or analysis.

The rock salt contains a considerable quantity of gas at high tension distributed in cavities throughout its mass, which not only accounts for the effervescence of the brine when pumped, but also while drilling, causes a frequent outburst of water, which it forces several feet into the air for many hours together. This gas has been examined by Professor Bedson, who found it to consist of—

Marsh gas	2·05
Nitrogen	97·95—100·00

Having drilled the well to the bottom of the salt, the next operation consists of tubing it and constructing the pumping arrangements for drawing the brine to the surface. A steel lining pipe, perforated where it passes through the sandstone and through the salt, is inserted from the surface to the bottom of the salt, then the suction pipe, also perforated at the bottom, is placed in the lining pipe, and the pump connected with the walking beam at a distance of about 240 feet from the surface, so that the brine will rise easily above it.

When the well is fitted ready for work it is usual to pump the discoloured brine to waste for a day or two, and thence to the reservoir when clear. At first the water employed for dissolving the rock salt and producing the artificial brine was obtained from the stells in the neighbourhood of the salt works, but the organic matter it contained so retarded the evaporation of the brine that its use was discontinued, and Darlington water was then poured down the annulus formed by the inside of the lining and outside of suction tubes. Now, however, the supply of water is exclusively derived from the sandstone which runs through the perforations in the lining tube and down the annulus to the rock salt below. The supply of this water is apparently inexhaustible, and the following is its analysis, viz.:—

	Grains per Gallon.
$CaCO_3$	21·59
$CaSO_4$	5·27
$MgCl_2$	9·14
$MgSO_4$	6·36
Na_2SO_4	33·33
SiO_2	0·74
Fe_2O_3 and Al_2O_3	0·74—77·17.

This water is now not only utilised for the production of brine, but it is also employed for the general works supply for feeding boilers, washing hurdles, and for the ash pits. At the Works of Messrs. Tennant and the Jarrow Chemical Company, Limited, a water-well was drilled into the water-bearing sandstone alongside a brine well, and only 12 inches from it. The brine well, of course, reaches the bottom of the salt at about 1000 feet from the surface, while the water well is drilled into the sandstone only. While these two wells are only 12 inches apart, the one produces excellent brine, and the other an unlimited quantity of water for the general works supply, by which an important annual saving is effected for Darlington water which would be otherwise used. When a new well is commenced, the surface of rock salt exposed for solution

is necessarily small, and its productive power limited to an hour or two pumping per twenty-four hours. As the water from the sandstone flows down the annulus to the rock salt the heavy brine sinks to the bottom of the cavity, and partly protects the rock salt at that point. The water or less saturated brine floats on the top, and thus solution of the salt takes place at the top of the bed, by which a cavity is formed, shaped like an inverted cone. As the brine is pumped from the bottom of this cavity, the water flows down the annulus from the sandstone, and thus the process of producing artificial brine is continued, while the cavity becomes larger, and its productive power increased as the surface of the rock salt is enlarged. The water from the red sandstone rises to within 20 feet from the surface in the annulus, and pressing on the brine below, forces it up the suction pipe, supporting a column of brine five-sixths of its own height. Thus a column of water 1200 feet deep in the annulus will force the brine up the pump tube 1000 feet, which leaves only 200 feet for the brine to be drawn to the surface, and which is accomplished by fixing the pump a few feet below the level of the brine. The brine pumps are driven at from 10 to 12 strokes per minute, and continued until the strength is reduced to say 24 per cent., when it is allowed to stand for the further formation of brine. This is repeated till the strength and quantity gradually increase, and in the course of a few months wells will yield good brine eighteen hours per day, and in some cases pump continuously night and day, except on Sundays. The quantity of salt produced from each well per week depends upon its size and age. The feeling amongst salt manufacturers on the Tees is to erect small wells and more of them, so that the loss of a well is not of great importance, and the wells now constructed are 8 inches diameter, though the salt and oil wells in America are $5\frac{1}{2}$ inches in diameter.

Excepting when a fall of marl occurs, by which the brine is rendered slightly red, it reaches the surface clear, bright, and very effervescent, due to the presence of a gas chiefly consisting of nitrogen. The average strength of the brine produced from eight wells at the works of Messrs Tennant and the Jarrow Chemical Company, Limited, contains 25 per cent. of salt, or about 40° Twaddell, while saturated brine is $26\frac{1}{2}$ per cent.

The artificial brine produced on the Tees, averaging, say, $25\frac{1}{2}$ per cent., is rather weaker than the Cheshire natural brine, which contains from 26 to $26\frac{1}{2}$ per cent. of salt, and which is produced by long contact of the water with the rock salt.

The operations for the manufacture of salt from the brine are apparently very simple, but considerable practice is required to overcome difficulties in detail. The method of manufacturing which has been so long practised in Cheshire has been adopted in its entirety on the Tees. The brine is evaporated in iron or steel pans which vary in size in different works, but for common salt, the chief product of the Tees salt manufacture, 70 ft. long by 24 ft. wide and 18 ins. deep, may be taken as an average. The evaporation is done by bottom heat, the pans being set on four longitudinal flues with a fire to each, and the flame traverses the whole length of the pan, which it leaves at a temperature of 500° to 600° F. As the salt forms, it is raked to the side of the pan, the bottom of which at that point is protected by what is called the dead flue. Every second day the pan is drawn, and the salt thrown with perforated shovels upon the hurdles, which are of wood caulked like a ship's deck, and so constructed with a fall that the brine drains back into the pan. As all brines are saturated solutions of sulphate of lime, in the manufacture of salt, this sulphate of lime, with salt, forms a hard crust on the bottom of the pans, which retards evaporation and causes great wear and tear on the plates over the fires, especially, and which constitutes an important item in the cost of manufacture. Every four or five weeks the pans are laid off to remove this scale, which in that time will accumulate to 2 or 3 ins. thick. Nearly all the salt manufactured on the Tees is known as common salt, and used in the alkali works on the Tyne.

Although common salt is chiefly produced on the Tees, yet the South Durham Salt Company, Limited, manufacture the other varieties such as fishery, curing table butter, etc., and it is admitted that the quality of the brine and the various salts produced on the Tees are all quite equal to the products of Cheshire. The fineness or otherwise of the grain in the different varieties of salt depends simply upon the temperature at which the brine is kept during evaporation. The higher the temperature the finer the grain, and the lower the temperature the larger is the crystal. The different kinds of salt are divided into boiled and unboiled. The fine-grained salt, such as butter, cheese, block, and domestic salts, are made in short pans of about 35 feet long, and kept at 224° F., the boiling point of saturated brine, the pans being drawn twice daily. Block salt is made by filling this salt into wooden moulds and drying in stoves with the waste heat from the pans, while superfine salt is produced by grinding these boiled salts. The loose fine salt is shipped mostly to India and Burmah, where about half a million tons go annually. The consumption of coal per ton of these fine-grained salts is about 14 cwts. Unboiled salts, such as common and fishery, are produced at temperatures below the boiling point of brine. For common, the brine is kept at about 160° to 190° F., and the pans drawn every two days, whereas for the larger grained or fishery, the brine is evaporated at about 130° to 160° F., and the pans drawn every four or five days. Extra fishery working at 100° to 110° F. and in long pans seven to eight days, large-grained bay salt is worked at 75° to 80° F. and drawn every three or four weeks.

The rapid development of the Tees salt industry is shown by the fact that in 1886, 98,000 tons were produced, while in 1887, 136,000 tons were made. During the same year the consumption on the Tyne was 116,486 tons, from which it will be seen that the productive power in South Durham now exceeds the consumption by the alkali manufacturers in this district.

In 1887 about two millions of tons of salt were produced in the United Kingdom, nearly three-fourths of which was manufactured in Cheshire. Out of the 2,000,000 tons made about 800,000 tons were exported, British East Indies and America being our chief customers.

THE CANCER OF THE CINCHONA.

In a communication to the Botanical Society of Hamburg, Dr. O. Warburg describes the nature of the disease known as cancer, which attacks the cinchona plantations of Java. There are two kinds of cancer, one infesting the root, the other the stem. The former is found beneath the bark, immediately below the ground in the form of a white flocculent fungus mycelium, from whence it extends to both stem and root, causing cracking of the bark. The fungus appears to be a rhizomorph, very similar to that of *Agaricus melleus*. The cancer of the stem makes its appearance higher up in the trunk and branches. It is caused by a parasitic fungus, propagated by means of spores, resembling that which causes the cancer of the bark. The diseased trees were also found to be attacked by *Peziza Willkonnaii*, but it was not evident that this fungus was the cause of disease.

The only efficacious remedy suggested by the author is to cut out the diseased parts; also to choose those varieties which seem least liable to the disease. He states that *Cinchona succirubra* shows itself in this respect a more desirable variety than *C. Ledgeriana*.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 29, 1888.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

REGULATION OF WEIGHTS AND MEASURES.

THE regulation of weights and measures should naturally be a subject of considerable interest for the pharmacist, and the inquiries we have received as to the progress of legislation having that object show that such is really the case. It will therefore be appropriate to state the actual position in which this matter now stands. The Bill brought before the House of Commons in reference to it by Sir MICHAEL HICKS-BEACH and Baron HENRY DE WORMS was dropped last session, and when again introduced in the session just concluded, did not make much progress. The general character of the Bill was described in this Journal last July, and it will be seen on reference to the article upon it that the amendments proposed to be introduced were not of such a nature as to alter materially the conditions under which the regulation of weights and measures has hitherto been carried out. The conduct of the work appertaining to the business was still left in the hands of local authorities, though provision was made that if any local authority or person empowered to act in regard to it failed to do so after being required by the Board of Trade to make regulations in pursuance of the law, the Board of Trade might make such regulations, and that these were to have the same effect as if made by the local authorities. It is, however, considered by some that even such a provision as this is insufficient for ensuring a proper degree of attention to the regulation of weights and measures generally throughout the country. There are many things in regard to which it is thought that the possession of a greater amount of controlling power on the part of a central authority would be useful and is even requisite in some instances. At present the Board of Trade can only take cognizance of weights and measures to the extent of defining and prescribing the standards which shall be used by inspectors of weights and measures throughout the country; but it has no jurisdiction over the inspectors. Neither is there any provision by which the competence of the inspectors for the exercise of their duties is to be ascertained and ensured. Each inspector is, to all intents and purposes, a law to himself, whether competent or not, and there is no obligation upon him to agree with the inspectors of adjoining districts. In all these respects there appears to be a want of some controlling influence by a central authority, and in a letter addressed to a former President of the Board of Trade by Messrs. AVERY, of Birmingham, the deficiencies of the law relating to weights and measures have been represented as urgently calling for amendment.

No question can be entertained as to the national importance of this subject being considerable, and it was very properly described by a former French Minister of the Interior by the remark that the precision of the operations carried out by inspectors of weights and measures is a guarantee which the government of a country owes to commerce. In all civilized countries this fact is recognized, and the legislative provisions in force take due account of the vital principle involved in the equal protection of buyer and seller. In Germany, France, Austria, Belgium, Holland, Italy and Scandinavia, laws are in force which preclude the possibility of any abuse or difficulty in operations involving weighing or measuring. This is also the case even in Japan. Germany possesses a complete code of laws and regulations on the subject. All new weighing apparatus, after having undergone preliminary technical examination at the hands of a special commission of three persons, two of whom are University Professors of Science, has then to be submitted to the ordeal of examination by a general commission—the Kaiserlichen Aichungs Kommission—which is a representative body from different parts of the empire. In France the subject is regarded of such importance that the equivalent of the German Commission is a delegation of the Ministry of Commerce and Agriculture, consisting of fifteen members, many of whom are persons of scientific eminence and the majority members of the Institute of France. Each country publishes its authoritative literature on the subject, explaining the construction of weighing apparatus, specifying conditions that must never be absent, and clearly defining what shall constitute lawful apparatus; also books on the law, manuals for the guidance of inspectors and for the instruction of aspirants to the office. In regard to all these matters, however, the English law is incomplete and defective. There are no provisions to ensure the competence of inspectors for the exercise of their duties, nor for the uniform conduct of the work they have to carry out, and it is one of the complaints urged in Messrs. AVERY'S letter that there was no remedial provision in the Bill introduced into Parliament for this glaring anomaly. It is also suggested that the opportunity offered by legislation on the subject should not be allowed to pass without a more satisfactory and thorough settlement of the whole subject of regulation of weights and measures in this country.

The means which are recommended as suitable to remedy the existing defects do not comprise the creation of a new and costly department of the State but simply consist in augmentation or extension of the powers of the Board of Trade of such a nature as to permit the establishment of a system and code of regulations which would meet all the requirements of a great trading community. It is not suggested that the immediate direction of the work of regulating weights and measures should be taken out of the hands of local authorities. The nomination and virtual appointment of inspectors of weights and measures might remain as heretofore with the local authorities, but there ought in any case to be proper arrangements, by which candidates for these offices should be required to evince some practical acquaintance with the duties appertaining to them, such as to satisfy the Board of Trade on this score. It is from that department instructions should be issued for the performance of the inspectors' duties, and the inspectors should also be accountable to that department for their conscientious fulfilment. The inspectors would be none the less servants of the local authorities; they would receive their appointment from them and would render to them the fees prescribed for verification and stamping. These are the main features of the system by which Messrs. AVERY propose that the present state of things in regard to regulation of weights and measures should be reformed. For the working of such a system they also suggest that a permanent commission should be appointed, consisting of persons of scientific attainments who are officers of the Board of Trade, together with one or two unofficial experts, as may be found desirable. Such a tribunal it is considered would merit the confidence of the public as well as of the makers of weighing and measuring appliances. For ensuring the proper qualification of inspectors, it is proposed that they should undergo an examination which need not be of an exhaustive or over-stringent character, though sufficient for testing the technical knowledge of candidates. Such examinations should be conducted under the auspices of the Commission. Another necessity arising out of the adoption of a system like that now referred to would be the appointment of travelling inspectors, who would exercise a general superintendence over the work done in particular districts, and it is considered that the fees arising from the contemplated certification and stamping of weighing machines, scales, etc., would amply suffice to cover the expenses incidental to those appointments. Lastly, it is urged that the reform of the law relating to weights and measures is to be regarded not merely as a local matter, but one of imperial importance; that it is an obligation of the State to see that exactly sixteen ounces shall be given by a vendor to a purchaser of a pound weight avoirdupois of any commodity, just as much as it is to guarantee for the gold coin of the realm its due equivalent in the silver currency. Indeed, there is no commercial interest of which the Government undertakes the regulation and guardianship which is more appropriate for the control of the only scientific department of the Crown—the standard department of the Board of Trade—than that of the regulation of weights and measures.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

December 12, 13, 14, 19, 20 *and* 21, 1888.

Present on each day—Mr. Carteighe, President; Mr. Bottle, Vice-President; Messrs. Barnes, Blunt, Bowen, Corder, Druce, Fletcher, Gale, Gerrard, Greenish, Ransom, Symons, Tanner, Taylor and Thresh.

Dr. Stevenson was present on the 19th and 21st on behalf of the Privy Council.

MAJOR EXAMINATION.

12*th.*—*Three* candidates were examined. *One* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Fowler, William Henry .....Chelmsford.
Hampson, William ....Leigh.

13*th.*—*Three* candidates were examined. *All* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Barnaby, William Arthur .....Lincoln.
Burton, Joseph Montague Chas. Llandudno.
Butcher, William Frederic ...Blackheath.

19*th.*—*Four* candidates were examined. *One* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Chaston, Alfred Edward .....Winchester.
Ecroyd, Walter .....Keighley.
Jackson, Urban Arthur .....Manchester.

20*th.*—*Five* candidates were examined. *Two* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Ough, Lewis..... .....Plymouth.
Parry, John .....Talgarth.
Robson, Tom Wardhaugh .....London.

21*st.*—*Five* candidates were examined. *One* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Barlow, Alfred Henry .....Gee Cross.
Vawser, Arthur .....March.
Wood, William .....Scotswood-on-Tyne.
Young, Edward .....Sudbury.

MINOR EXAMINATION.

12*th.*—*Twenty-seven* candidates were examined. *Seventeen* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Ainley, Edward Theodore.....Mirfield.
Allen, Willie.....Basingstoke.
Asbury, Thomas .....Buxton.
Bailey, Herbert Henry .....Hemel Hempstead.
Barker, Joseph .....Doncaster.
Bayley, Alfred Jonathan .....Lancaster.
Beauchamp, Frederic Crawley. Hemel Hempstead.
Brackenbury, Richard Hayes..Bardney.
Chamberlain, Edward Tracy...Hull.
Clarke, William Ernest .....Aberystwith.

13*th.*—*Twenty-seven* candidates were examined. *Twelve* failed. The undermentioned *fifteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Andrews, John Henry .....Winchester.
Cammack, John F. Jeffrey ...London.
Colenutt, Frederick Moreton ..Shanklin.
Cook, George Russell .....Grimsby.
Cox, Frank Frederick.....Bath.
Croasdale, James Coward ..... Ulverston.
Dennis, Fred Woodrow .....Louth.
Desborough, Norton Desborough. Stamford.

Douglas, William Boyce .....Torquay.
Duffin, Charles William.....Wakefield.
Eastwood, Frederick Allen ...Rochdale.
Franklin, John Henry .....Manchester.
Gamble, Arthur George.....Yarmouth.
Gardner, John .....Bolton-le-Sands.
Gaziello, Marius .....London.

14*th.*—*Thirty* candidates were examined. *Thirteen* failed. The undermentioned *seventeen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Davies, Henry .....Dowlais.
Evans, Thomas Henry .....Llanelly.
Godwin, Frederick James.....London.
Gough, Ernest William.....Clifton.
Graham, Joseph .....South Shields.
Green, Herbert John .....Deal.
Hall, Thomas Henry ... .Hebden Bridge.
Harris, Herbert .....Kirton Lindsey.
Heap, Isaac Henry.....Hanley.
Hearne, Robert Moore .....Worksop.
Hobbs, Alfred Ernest..... .....Tunbridge Wells.
Hope, Herbert Ash.....Uppingham.
Hunt, Frederick Hastings ...London.
Jenson, Alexander Benjamin..Birmingham.
Jones, Edwin Robert .....Bromyard.
Junor, John .....Fortrose.
Keene, Frederic John ....Oldbury.

19*th.*—*Twenty-six* candidates were examined. *Fourteen* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Jones, John .....Llandovery.
King, Lawence Bowdler .....Turnham Green.
Lee, Leonard .....Huddersfield.
Lupton, Slater.....Rochdale.
Marshall, Robert James .....Boston.
Maxwell, Thomas Wellwood...Montrose.
Medd, William.....Gloucester.
Mills, George .....Southsea.
Myers, Benjamin.....London.
Neville, Thomas Crofts .....Leamington.
Nunn, Arthur William .....Colchester.
Parry, John Alwyn .....Llangefni.

20*th.*—*Twenty-seven* candidates were examined. *Ten* failed. The undermentioned *seventeen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Baker, Alfred Henry Sanzen...Gateshead.
Broome, Bertie.....Cromford.
Gregory, William John .....Weymouth.
Parkyn, Horace .....Bath.
Prince, Roland.....Longton.
Proudman, Edward William...Leominster.
Reynolds, Charles Edwin .....Sevenoaks.
Robinson, Wm. Shakespeare...Birmingham.
Rundle, Charles Walter.....Cardiff.
Ryan, Walter Thomas.....Jersey.
Samm, Archer Gerald.....Luton.
Saville, Edwin .....York.
Shaw, William Alfred .....Sheffield.
Shrubsole, Alfred.....Chester.
Stainer, John Ward .....Folkestone.
Tomlinson, Charles Parker ...Peterborough.
Ward, Oswald Thomas .....Diss.

21*st.* — *Twenty-four* candidates were examined. *Ten* failed. The undermentioned *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Chantry, John Henry.....Horncastle.
Smith, Charles.....Wellingborough.
Tupholme, John James .....Spilsby.
Turver, William .....Nottingham.
Vaughan, Edward Edwards ...Rhyl.
Vincent, John .....Watton.
Watkins, Patrick Henry.....Hitchin.
Wheeler, Alfred .....Bristol.
Wilkinson, Frank .....Nottingham.
Williams, William George.....Hirwain.
Wood, Godfrey Charles.....Newport.
Woodruff, Thomas .....Stalybridge.
Wright, Arthur George .....Plymouth.
Younger, William Elliot .....Brampton.

MODIFIED EXAMINATION.

19*th.*—*Two* candidate were examined, and failed to pass.

PRELIMINARY EXAMINATION.

21*st.*—Certificates by approved examining bodies were received from the undermentioned in lieu of the Society's examination:—

Bennett, John Henry.....North Kensington.
Betts, Reginald .....Woodbridge.
Finlayson, William.....Stockton-on-Tees.
Graham, Charles H. .....Liverpool.
Hanson, Arthur .....Bingley.
James, David Griffith.....London.
Massey, Cecil .....Spalding.
Sansom, Maurice.....Barrow-in-Furness.
Waddy, Ernest Alfred .....Bristol.
Williams, Harold Herne .....Bournemouth.

Resolved—

"That the Board desires to place on record its high appreciation of the valuable services rendered to the Society and to pharmacy by Mr. James Benjamin Barnes during the long period he has been a member of the Board. His colleagues venture to express their regret at his retirement from among them, and their best wishes for his future health and happiness."

Proceedings of Societies in London.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held on Wednesday the 19th inst. at 17, Bloomsbury Square. Present—Messrs. Umney (President), Attfield, Plowman, Martindale, Davies, Gerrard, Ransom, Greenish, and Messrs. Naylor and Thresh, Hon. Gen. Secs.

A copy of the 'Year-Book' was laid upon the table and the Secretaries announced that it was now ready for distribution to the members.

Mr. L. Siebold was re-elected Editor of the 'Year-Book.'

Dr. Thresh reported that he had consulted Mr. Siebold with reference to the Blue List, and it was decided to ask Mr. Siebold to undertake its revision and to proceed with the work without delay.

The appointment of an Honorary Secretary for Canada was deferred, the Hon. Secs. being requested to communicate with a gentleman whose name had been suggested by the retiring Hon. Sec.

The following donations were acknowledged:—'The 24th Annual Report of the Alumni Association, 1887–8,' 'The 14th Annual Report of the Yorkshire College, 1887–8.'

A number of gentlemen were duly nominated and elected members.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held on Thursday, December 6, Mr. E. J. Millard, President, in the chair.

The minutes of the previous meeting having been read and confirmed, and several new members proposed, the President called on Mr. Francis Ransom to read his paper on:—

Standardized Pharmaceutical Preparations.

BY FRANCIS RANSOM.

In responding to the invitation of your Secretaries to address your Association, I fully appreciate the privilege which you confer upon me. Your meetings during recent years have afforded the opportunity of making public the results of so much work of practical pharmaceutical value, that I have especial pleasure in being associated with you on the present occasion.

The subject which I have decided to bring before your notice this evening is one which owes its existence and is essentially the outcome of modern pharmaceutical and chemical research. The treatment of disease by medicine has from the most remote periods been very largely, and at times almost purely, empirical. The tendency of the latter part of this century is, however, entirely antagonistic to empiricism. As our knowledge of the laws which govern life becomes more extended and our intimacy with the structure and functions of the organs on which life is dependent increases, something more definite than the very haphazard methods of medical treatment in the past has become essential. That empiricism can or should entirely disappear in the present state of medical knowledge is not to be expected, and any attempt to confine therapeutics to exact scientific precision would probably result in failure. Notwithstanding the progress that has been made, we are far from being able to explain the more subtle workings of life, and until much more is known, both in connection with the patient and the drug, a purely scientific treatment is impossible. It is only within comparatively recent times that drugs have been shown to owe their potency to certain definite principles. In times that have scarcely yet become historic the idea that the essentially active portion of nux vomica, for instance, could be isolated, and would consist only of about $\frac{1}{60}$th of the entire weight of the drug, would have been considered extremely visionary. When, in the early part of the present century, it was found to be possible to separate certain fixed principles from organic drugs, a new era in the history of therapeutics seemed to have dawned, and the energies of many of our most able chemists were directed towards the discovery of fresh alkaloids, which should represent the activity of the barks, leaves or roots from which they were to be obtained. The discovery and consequent use of these various alkaloids, glucosides and other definite principles, has not met with the complete success that was at first contemplated. It is now very largely admitted by physicians of the highest standing that equally favourable results are frequently not to be obtained from the use of certain alkaloids as are derived from the administration of corresponding doses of the crude drug itself or of simple galenical preparations of the same. The mixed alkaloids of cinchona, when separated from the bark and purified, do not invariably prove as efficacious as the old decoction or infusion. Aconitine, apparently, often does not represent the whole activity of aconite, and a mere solution of strychnine and brucine is not at present likely to supersede the tincture of nux vomica.

This apparent loss of activity is not always easy to account for, but certain causes suggest themselves as doubtless to some extent responsible.

In the first place the natural inference would be that we have been mistaken in applying the term "sole active constituent" to the isolated principle which has been extracted. May there not be present in the very complex material forming the crude drug various other constituents, inert perhaps in themselves, but of distinct value in drawing out or intensifying the properties of other bodies present? In the case of alkaloids the natural acids with which they are in combination may, in certain cases, be of more importance in the action of the drug than has usually been supposed.

Again, it has been shown that certain alkaloids, during the process of extraction, are subjected to treatment which may alter their character. A striking instance of this has recently been exposed by the German chemist Will with reference to the alkaloid of belladonna. On the authority of Ladenburg it has of late been supposed that belladonna root contains the two isomeric alkaloids, atropine and hyoscyamine. Will has shown that with due precautions pure hyoscyamine may be obtained from this source, and that the atropine usually found is the result of the exposure to heat or alkali to which the hyoscyamine has been subjected during extraction. Here, then, our physicians have for many years been using a mixture of the two alkaloids, or perhaps at times pure atropine, under the impression that they were prescribing the active principle of belladonna, while in reality they have been administering a body which may but seldom, if ever, exist in the natural drug. Another example of this kind is to be found in aconitine. Mandelin has shown that commercial aconitine is frequently contaminated with the decomposition product aconine, and he attributes the uncertain action of the alkaloid largely to this cause. If then, this has occurred, and for long remained unnoticed in the cases of such important drugs as belladonna and aconite, we may well suppose that in other cases, where the active principles have received comparatively little attention, similar errors have crept in.

If then we allow that the so-called active principles do not invariably represent the full activity of the drug, it follows that however interesting, and in many cases, useful these definite bodies may be, there still remains for the present the need for the old-fashioned, and often time-honoured preparations which we know as galenicals, and in the careful preparation of which we may reasonably infer that the natural combinations and associations are to a large extent preserved.

In order to ensure approximate constancy in some of these galenical preparations, there were introduced into the last edition of the British Pharmacopœia certain extracts and tinctures which, if carefully prepared according to the directions given, would always contain a definite percentage of the most active constituent or constituents. The term *standardized* has been introduced to express the definite character of these preparations, and although apparently liable to misconstruction, it seems fairly well to represent that which it is intended to imply.

Before discussing the advantages and objections which have been urged, it will be well to have a clear idea as to what is actually intended to be expressed. Standardized preparations are never claimed, even by their most ardent supporters, to be absolutely uniform in composition. Opium, for example, contains many active constituents besides morphia, but morphia is that which to the largest extent determines the value of the drug, and on the presence of which its use in the great majority of cases chiefly depends. The Editors of the Pharmacopœia wisely determined that this drug, so largely used in pharmaceutical preparations, should be so regulated by selection that it and its preparations should always contain an almost uniform proportion of this alkaloid. If the physician desire to employ still more exact remedies, the separated alkaloids are at his disposal and may be prescribed in any proportion that he may wish. It has been contended that opium is occasionally prescribed with the intention of obtaining primarily the effects of codeia, but even in this case, the fact that a definite instead of an unknown proportion of morphia is also present, could not injuriously affect its action. If, again, it is known that the alkaloid strychnine will produce the desired effect, let a definite solution of

this alkaloid be used, instead of the impure solution which occurs as a tincture of nux vomica. But because the prescriber may in certain cases choose exact remedies, let us not on that account seek to render absolutely indefinite the more complex agent which is at other times employed.

Standardized preparations are introduced to supply a need, it may be temporary, which the present conditions of medicine seem especially to demand. In days gone by, when the value of a mixture or a pill was considered to depend largely upon the number of ingredients which it was made to contain, the need for a definite standard was not so great. If one of the ingredients happened to be of inferior quality, the chances were that this deficiency might be largely compensated for by the activity of the others of similar properties that were present at the same time. With the recent advances in therapeutics, however, it would often be considered beneath the dignity of a scientific prescriber to include at one time a number of ingredients possessing the same or very similar medicinal properties. Consequently, this chance for compensation is lost, and if the drug on which the virtue of the medicine is expected to depend happens to be of inferior quality, the health of the patient and the reputation of the physician are alike liable to suffer in consequence. Although, as already stated, standardized preparations are not absolutely uniform, they are, or at least should be, sufficiently constant in action to produce practically the same results under ordinary conditions.

We will next consider what are the conditions essential for the introduction of a standardized preparation. It must be fully allowed that with our present limited knowledge the number of drugs or preparations of drugs which can be so treated is comparatively small. In the first place it is necessary that the principle which it is proposed to render constant should be known to be of the first importance. It would, for instance, be obviously absurd to standardize rhubarb for chrysophanic acid, unless, indeed, it could be shown that the other constituents to which rhubarb owes its activity remained fairly constant to the proportion of chrysophanic acid present. For similar reasons it would be impossible to obtain satisfactorily standardized preparations of gentian, ergot, cascara sagrada and many other common drugs. Secondly, presuming that we do know certainly that the activity is essentially due to a certain constituent, we must have at our command a process of estimation, which shall be generally acknowledged to be accurate in result, and not difficult in manipulation. This requirement unfortunately removes from our list many preparations which are known to vary much in activity, and for which some guarantee of efficacy would therefore be of great advantage. Aconite may be taken as an example of the case in point. There are probably few common drugs whose preparations are more uncertain in strength, but we are absolutely without a method of assay which could be put forward with any confidence.

The necessity of an official process of assay being devoid of any insuperable difficulty to the ordinary pharmacist, may lead to questions which it is beyond the scope of the present paper to discuss. That the average chemist and druggist has been capable of but little in the way of analysis is a fact that we may deplore, but which should not bear much weight on the present question. I fully believe that the professional ability of the British pharmacist is steadily advancing, and in order to encourage or stimulate to further improvement, I consider that it is fully justifiable to introduce processes into the Pharmacopœia, which the comparatively uneducated or incapable druggist may find to be beyond his grasp. The methods for standardization that already exist in the Pharmacopœia, are such as no educated pharmacist should find difficulty in performing, and the comparative freedom from hostile criticism since their introduction seems to indicate that they are generally so regarded. We have, it is true, been reminded that in certain cases of assay they will not afford absolutely accurate results, but then we have also been assured on equally high authority that absolute accuracy is not to be expected in pharmacopœial methods.

We must now consider the objections that have been raised to the general principle involved, and any practical difficulties that may have arisen in cases in which processes of this description have been adopted. On referring to pharmaceutical literature I find that the hostility which was at first provoked when it became known that standardized preparations were likely to find recognition in the Pharmacopœia, has apparently ceased to exist. Since Martin's paper on the preparations of nux vomica was read at the meeting of the British Pharmaceutical Conference in 1886, I have been unable to find any published hostile criticisms. Whether the once active opponents have been converted to the principles of uniformity, or whether their opposition is still latent, and only awaiting a suitable opportunity for again asserting itself, I will not venture to say. As, however, it is quite possible that any attempt to increase the number of official preparations of this character would meet with renewed opposition, and as the objections that would then be raised would almost certainly be identical with those that have already been used, it may be well briefly to consider those which have been urged.

The point which was probably the most influential in the minds of those who have spoken unfavourably of standardization was based upon the fallacy already referred to, that these preparations are claimed to be absolutely uniform. We are told that if the prescriber desire to administer exact doses of his remedies, he has the isolated active principles at his command, and can order them in any proportion that he desires. If on the other hand he prefers the vagueness of galenical preparations containing unknown proportions of these active constituents, it is outside the duties of the pharmacist to endeavour to supply him with an article which shall be of a standard strength. I must confess that the precise argument is somewhat difficult to grasp, but it would seem to indicate that at times prescribers are supposed to prefer to relieve themselves of the responsibilities of their position, and to trust to fate that the right effect may be produced by the unknown dose which is administered. Such teaching, however, is opposed to experience, as it has usually been found that fate is most favourable to that treatment which is conducted on the basis of well defined knowledge. So far as I am aware, this idea has not been suggested or approved by the physician himself, but only by certain pharmacists on his behalf. When, however, we are commended to discourage as far as possible the use of galenicals in favour of the more definite active principles, it might with more justice be contended that we are exceeding our duties. By all means let the pharmacist encourage the physician to use absolutely definite remedies by providing for him, as far as possible, the active constituents of drugs in a state of absolute purity, but do not let us attempt to drive him to this by supplying him with galenicals of uncertain strength. A distinguished therapeutist, Professor Leech, of Owens College, probably more correctly expressed the views of the medical profession, when, in addressing the members of the Pharmaceutical Conference at Manchester, he said, "A time will come when we shall have determined the best combinations and admixtures of the alkaloids for therapeutic use, and then our combinations and admixtures will be more definite than those now provided for us by nature in drugs. Meanwhile there will be an increasing call for preparations rendered uniform in composition by minute care in preparation, and guaranteed by the

vendor." So long then as galenical preparations are prescribed it is the duty of the pharmacist to make them as reliable as possible, and judicious standardizing must promote this end. Let us also here take warning. Several enterprising firms of manufacturers already largely advertise various constant or standardized preparations that are not yet officially ordered as such in the Pharmacopœia. Unless official preparations are rendered more reliable the practice of prescribing proprietary articles of special brands will increase, to the evident detriment of pharmacists at large.

It has further been urged that in certain cases alkaloids exist in the same plant which are antagonistic to each other in physiological action. If this be the case, it would undoubtedly be a serious obstacle in the way of standardizing preparations in which such are to be found. It may, however, safely be asserted that in no drugs which have hitherto been officially used for such preparations do such antagonistic principles exist. Nux vomica was at one time suggested as being a case in point, and it has been urged that the 15 per cent. of total alkaloids may imply very varied properties, according to the proportion of strychnine to brucine that may happen to be present. Recently, however, it has been found that brucine is comparatively inert, and that its presence is in no degree antagonistic to the associated alkaloid. Undoubtedly it would have been preferable, if possible, to have produced an extract containing a constant percentage of strychnine, but the difficulty of separating these two alkaloids appears for the present to be sufficient to prevent the introduction of a suitable process of assay for such a preparation. That a much nearer approach to uniformity in the actual percentage of strychnine present in the standardized extract has been reached, may be seen by reference to the published results of Dunstan and Short's investigations. In the case of cinchona it is well known, although perhaps not sufficiently recognized by prescribers, that the action of all its alkaloids is very similar.

The objection which has been raised on account of the assumed difficulty of preserving standardized preparations for any length of time in an unaltered condition may be regarded as a criticism on the methods adopted or the results obtained, rather than on the essential principles which are involved. If, for instance, it could be shown that the official liquid extract of cinchona as met with in commerce does not correspond with the required standard, the inference to be drawn would be either that reasonable care is not bestowed upon its preparation and preservation, or that the method officially employed is not adapted for general use. The extract and tincture of nux vomica have received most attention in this direction. In a paper already referred to, the report of an examination of a number of samples of the tincture obtained from various parts of the country indicated that the desired uniformity had not then been arrived at. Considering that the new edition of the Pharmacopœia had only been published a few months previously, the value of these results cannot be considered so great as that which would follow a similar investigation at the present time. Many of the tinctures examined had probably been prepared before the new formulæ had become official, and in some cases it is not unlikely that old and new stock had been mixed. Allowing, however, that certain discrepancies had occurred, the final result indicated some improvement on the condition of things revealed by the previous examination of Dunstan and Short. I think we may reasonably believe that if another investigation were now made, we should find still further improvement.

An alternative suggestion that the crude drugs should themselves be required to be of a standard strength instead of the preparations, has commended itself to some pharmacists. The official red cinchona bark when used for galenical preparations must now contain from 5 to 6 per cent. of total alkaloids, at least half of which must consist of quinine and cinchonidine, and thus affords an instance in which this suggestion has been to some extent carried out. On account of the immense quantity of this bark that is now imported, and the fact that a variety is easily obtainable answering this description, cinchona seems to offer especial opportunities for the success of this method of attaining some approach to uniformity. Even here, however, the editors of the Pharmacopœia, foreseeing the probability that different manipulators would obtain different results, thought it necessary to employ additional precautions to ensure the constancy of the liquid extract. It is well known that from the same sample, preparations varying much in strength may be obtained by different manufacturers, although all are presumably working according to official published instructions. Upon the care and skill employed on processes of maceration, percolation and evaporation, depends much of the potency of the final product. Happily, the necessity of instructing pharmaceutical students in the operations of practical pharmacy is now more fully recognized than formerly, and we may expect good results to follow, but that variations of the kind referred to will ever altogether disappear is not to be expected. The estimation of a crude drug also usually presents more difficulty and occupies a longer time than is employed in the assay of an extract or a tincture. In the hands of an ordinary pharmacist, I believe that the alkaloidal value of an extract of nux vomica or of belladonna would be determined with more accuracy than would result from an assay of the seed or root yielding these preparations. The difficulty of obtaining a sufficient supply of the drug of standard strength would often be considerable, and although in the case of large manufacturers this might be overcome by the admixture of samples of different qualities, the retail pharmacist, who prefers to prepare his own galenicals from drugs in their natural condition, would be put to serious inconvenience. If on the other hand the preparations only have to be standardized, crude drugs varying considerably in quality might be used to obtain uniform results.

The best form in which to use standardized preparations is a branch of the subject requiring much attention. Extracts of ordinary or pilular consistence, powdered extracts, liquid extracts and tinctures, respectively offer certain advantages, but each at the same time presents certain difficulties. If we allow that galenical preparations should as far as possible contain the active constituents in the same conditions and combinations in which they exist in the crude drug, it follows that care should be taken to use such processes for their manufacture as shall be least likely to effect alterations. Heat, as is well known, is liable to produce changes in combinations with weak organic acids, and even to alter the constitution and character of some alkaloids. In cases where it has been shown or can be proved that heat does produce deleterious alterations of this description, tinctures prepared by simple maceration and percolation would naturally commend themselves as most desirable. The tincture should at first be prepared in a concentrated form; a sample of this should be estimated according to official directions, and the remainder diluted with spirit to the required strength. A method of this kind was originally proposed by Dunstan and Short for preparing tincture of nux vomica, but at the same time they suggested the alternative process of dissolving the requisite amount of alcoholic extract in a diluted alcohol, and this latter method has been adopted in the Pharmacopœia. The advantage of preparing a tincture from the standardized extract in this manner is obvious; economy and convenience is effected by

necessitating the retail chemist keeping a stock of extract only from which the tincture may be prepared at a moment's notice. At the same time it is doubtful whether the advantages exceed those offered by a tincture prepared directly from the seed, and which has consequently not been subjected to heat. A tincture can probably be more easily protected from the effects of atmospheric changes than an extract, for if kept in a well stoppered bottle it would remain for an indefinite period, under varying conditions, without any material alteration in strength. In cases where the active principles are more easily affected by heat than is the case with strychnine, the advantage of making the standardized fluid preparations directly from the crude drug is more evident. Fluid extracts usually require some evaporation by heat, but they would probably rank next to tinctures, as representing the full activity of the drug, if the first portion of the percolate be reserved and the remainder evaporated, the resulting extract being dissolved in the reserved portion. If, as has been suggested, fluid extracts can be prepared by a process of repercolation, and without any evaporation, they would offer special advantages for standardization. A fluid extract of belladonna of this description, besides being a valuable preparation in itself, might be used for making both the tincture and liniment. Fluid extracts made by dissolving the ordinary extracts in alcohol or water are obviously open to the same objections as tinctures similarly prepared. The official liquid extract of cinchona may here be conveniently noticed as representing an entirely new form of preparation. Dilute hydrochloric acid and glycerine are used to exhaust the bark, they having been found from careful experiment to extract much more alkaloid than water alone. The percolate is assayed by an easy method, special care however being necessary to ensure the dryness of the residue, and the finished product is made to contain 5 per cent. of total alkaloids. We obtain as a result an elegant preparation which might have been expected to become a favourite with medical men. For one or more reasons, however, it does not seem to be as largely used as was anticipated, and by some prescribers the old liquid extract of the 1867 Pharmacopœia is still preferred. This may be partly accounted for by the very small maximum dose that is inserted. Ten minims of this liquid extract contain only ½ a grain of the cinchona alkaloids, a dose which is much less than that usually given of the separated alkaloids, or only half that of the minimum official dose of sulphate of quinine. May it not also be possible that the presence of hydrochloric acid is also partly responsible for the want of popularity which it has met with? If such a preparation should contain the alkaloids in their natural combinations, it must be acknowledged that the old liquid extract was in this respect superior to the new. A standardized preparation, obtained by percolation of the bark with cold or warm water and glycerine, might fulfil a want which does not yet appear to be satisfied. I believe that the favourite galenical preparation of cinchona is the decoction, in which the natural associations of the alkaloid are probably but little changed.

The advantage of a solid extract of ordinary consistence depends principally upon its convenience for immediate use. On the other hand it is more susceptible to alteration from absorbing or losing moisture, than other preparations. The extracts of nux vomica and opium may on the whole be considered satisfactory, but others might be open to serious objection. The alcoholic extract of belladonna root, for instance, could not be standardized in this form, on account of its hygroscopic nature and the great variations in the alkaloidal value of the commercial root. The so-called green extracts of the Pharmacopœia would also probably present insuperable difficulties, as in order to keep well it is necessary that they should always be of firm consistence. The presence of chlorophyll and other inert matter also tends to increase the difficulty of obtaining a satisfactory process of assay.

Powdered extracts or abstracts offer certain advantages for standardizing and might probably be successfully employed in some cases. A standardized powdered extract of belladonna has been suggested by Professor Dunstan and myself, and would probably be found a useful preparation. These abstracts have been objected to on the ground that the admixture of any foreign substances is in itself undesirable. A diluent would always be required to reduce the extract to the standard strength, but if sugar of milk be solely employed, it is difficult to believe that any inconvenience would be incurred. A more important argument against their introduction would consist in the prolonged subjection to heat necessary for their preparation.

The only official standardized preparation that has not been referred to, deserves mention, if only as suggesting another method of obtaining the desired result. Cherry-laurel water, formerly very uncertain in strength, is now required to contain ·1 per cent. of real hydrocyanic acid. This is obtained either by dilution with distilled water, or by the addition of the requisite amount of the official solution of the acid.

In conclusion, I would refer to a few other preparations which might with advantage be standardized, or at least deserve investigation with this object in view. Probably few drugs now met with are more variable in quality than jalap. Squibb reports that the resin, in ten samples that he examined, varied from 6·19 to 18·5 per cent., and still more recently Cripps finds commercial specimens varying from 5·8 to 15·6 per cent. The Pharmacopœia requires that official jalap shall yield at least 10 per cent. of resin, but even this allows room for much variation in the strength of its preparations. If the resin is the sole active constituent, it might be well to prepare the tincture from it instead of from the root, but if the present method be continued, a definite amount of resin should be required to be present.

There are also instances in another class of preparation, which, if they cannot be reduced to an absolutely definite standard, should at least be required to show but little variation. The official juices are still popular with many of the medical profession, and probably offer some advantages which cannot be obtained elsewhere. An interesting paper, recording the results of an investigation of certain juices, was read before your Association some years ago, and indicated in some cases a serious absence of uniformity. This is largely accounted for when we consider the varying conditions under which the juice is expressed. If the plants are gathered in a wet season, or grow in damp situations, the amount of moisture present is largely increased, and it may be expected that the strength of the expressed liquor will be deficient. Belladonna and henbane juices can be easily assayed by a modification of the process suggested for the alcoholic extract of belladonna, and if care be taken in selecting suitable plants, it is probable that no great difficulty would be encountered in obtaining a fairly uniform product. Hemlock juice is a preparation which has enjoyed some popularity, and might be of increased value if more uniformity could be obtained. The alkaloid conine, being easily dissipated by heat, is probably to a large extent lost in the preparation of the extract; in the succus conii, prepared in accordance with Pharmacopœial directions, no such loss takes place. Methods for the assay of the alkaloid have already been proposed, and could probably be easily adapted to the estimation of the juice.

Preparations of other drugs, such as physostigma and jaborandi, suggest themselves as possibly fitted

for standardization, but further work is required to investigate their constituents and to provide suitable methods of assay before definite proposals can be entertained.

I have now briefly laid before you some of the chief points in connection with a subject which I believe to be of especial importance at the present time. We are continually being reminded that the profession of pharmacy in this country is passing through a critical period, and gloomy visions of a possible future are often in the ascendant. We are asked whether the retail chemist shall degenerate into a mere vendor of patent medicines, proprietary articles and sundries, which can usually be obtained on more advantageous terms at any grocer's or hairdresser's. This, according to some prophets, is the direction in which we are moving. But a more hopeful alternative is before us. It is dependent upon the increased ability and experience of the pharmacist, thereby assuring the confidence of the public and more especially of the medical profession. Clear evidence of active and intelligent interest on our part in matters relating to the science of pharmacy is likely to be the most powerful argument in convincing the physicians of our claims to consideration. I venture to assert that the increased reliability of drugs and pharmaceutical preparations, as secured by standardization, will tend in this direction. Investigations with this object in view may be efficiently carried out by members of this Association, which has already shown itself to have the highest interests of our calling at heart, and in whose ranks are to be found practical pharmacists of recognized ability.

At the conclusion of the paper—

The President said the members of the Association were deeply indebted to Mr. Ransom for his valuable and interesting paper, which had certainly produced overwhelming evidence in favour of the standardization of drugs. He believed there was now but little opposition to the author's views, although at one time it had been considerable. The use of such preparations as valoids was daily increasing, and one firm even went so far as to advertise standardized tinctures, the standard being, however, merely the amount of total solids. He understood on the authority of Dr. Lauder Brunton that pure brucine was absolutely inert, and he should be glad if Mr. Ransom could in any way confirm this. With regard to the standardization of extracts, he was afraid that such preparations as the green extract would offer almost insurmountable difficulties in estimation; great difficulty had been found by Smith in even estimating the official succi. In conclusion, he hoped the members would fully discuss this important subject.

Mr. F. W. Short thoroughly agreed with Mr. Ransom in the views expressed in his paper. One drug in particular that appeared to him to urgently require standardization was ergot, as so many conflicting statements were made about the activity of its preparations. He might mention in reference to conium that he had found Cripps's method of assaying to yield excellent results. They must remember that it was not only necessary to prepare standardized preparations, but to keep them of definite strength when made. They must be examined from time to time to see if they remained constant. He was much gratified on lately examining a sample of ext. nux vomicæ, made many years ago, to find that its strength had remained practically the same. He certainly advocated the use of strong tinctures as a convenient form in which to keep standard remedies, being less likely to alter or decompose. He was afraid, however, that all the ingredients in the drug were not sufficiently considered in attempting to obtain a standard preparation. Having found an alkaloid, most investigators seemed quite satisfied, and ignored any glucoside or resins that might be present.

Mr. T. S. Dymond had listened with much pleasure to this valuable and instructive paper. He could not help thinking that a great many of the statements that had been made to the effect that preparations of the crude drugs had a different effect to their alkaloids were due to old-fashioned prejudice. During the preparation of these standardized products so many changes were undergone that in some cases an alkaloid was developed that did not exist in the crude drug, and in others more alkaloid was added to what was already there. There were, however, many arguments in favour of the utility of standardized preparations, and he must confess that enough work had not yet been done in the direction of ascertaining as to what the effect of many drugs was really due, still he felt doubtful whether these preparations would possess many advantages over the alkaloids themselves, at least over their natural salts. Every effort should be made to find out to what the effect of vegetable drugs was due, and standardization, in his opinion, should not be considered as the final aim of the subject.

Mr. F. C. J. Bird said Mr. Ransom was in favour of estimating the preparation, and not the crude drug, direct, and it seemed to him a question whether this might not sometimes allow the presence of an inconvenient quantity of inert material. In preparing a quantity of succ. taraxaci lately, he had found the yield to be one-fifth less than last year, and it seemed fair, therefore, to conclude that either the product this year was stronger than that of last, or that last year's product must contain much more inert matter.

Mr. F. McDiarmid fully agreed with Mr. Ransom as to the principle of standardization, but there were many practical difficulties to be overcome, and the results at present were not quite satisfactory. Extract of nux vomica, for instance, was to be found of all appearances from that of treacle to a pilular consistence, and tinctures made from it varied very greatly in tint. No doubt a powdered extract would be a great improvement. In estimating the present extract the considerable quantity of oil which was sometimes present gave trouble by dissolving in the chloroform, and so it was often difficult to get a pure alkaloid for weighing. He should like to know if Mr. Ransom had noticed this, and could suggest a method of obviating it. He would also like to know what was to be done with the large stock of 15 per cent. opium that many manufacturers had on hand, and how it was to be utilized for making the B.P. preparations.

Mr. G. Richards feared that great difficulty would be found in standardizing barks and roots; the supply of these articles was entirely in the hands of the drug brokers, and he would suggest that these forms of drugs should be standardized and sorted before being sold. Many samples of jalap had been sold containing no resin, ipecacuanha containing no emetine, and so on, and unless some check was placed upon the sellers, he thought that uniformity in the strength of many drugs and their preparations would be impossible to accomplish.

Mr. W. L. Williams thought that every pharmacist should be able to estimate his drugs himself, and not trust to the broker's account of their value. With regard to the change some alkaloids underwent in the process of making preparations of the drug containing them, it was well-known that some alcohols were liable by decomposition to form other alcohols or mixtures of alcohols, whose optical activity was different from the parent compound, and he thought it possible that some such change as this occurred in the change from atropine to hyoscyamine, for it was on the difference

in optical activity that Will appeared to rely for evidence that the change was complete. He should like to ask Mr. Ransom whether the change, in his opinion, did not really consist in the splitting up into two substances of the parent alkaloid.

Mr. N. H. Martin agreed with the general principle of standardization as laid down by Mr. Ransom, but he thought that it should rather take the direction of ascertaining as to what the activity of preparation was due and standardization the secondary consideration. It was important to avoid torturing the drug by a long and elaborate process, for they could not always say what the result might contain. Hardly enough work had yet been done to prove the difference between the action of the drug and its alkaloid, but most physicians were agreed that there was a difference. He liked to see some work done in the direction of first ascertaining the active principles, and then devising preparations of those.

Mr. T. A. Ellwood said that standardization was no doubt of very great value and deserved more attention than it received. He agreed with Mr. Bird that standardization should be directed towards the drug itself rather than its preparation. He hoped before long to see extracts prepared in powder form instead of that of pilular consistence. The difference in the colour of tinctures made in the same way was a great inconvenience, and he wished that some process of decolorization could be applied before the preparation was finished. Tincture of opium, for instance, varied considerably in colour, and some makers still employed the old fashioned process of using hot water and adding the spirit when cold. He considered that tinctures of many drugs could be made of better quality by the employment of two menstruums, for instance spirit and diluted glycerine. Four years ago, he had made experiments with the amount of extractive in tinctures, and out of twenty-five samples of the same tincture (from different specimens of drugs) no two contained the same quantity of solid matter. A method of titration might perhaps be usefully employed in estimating drugs containing alkaloid, and glucosides of known composition might possibly be estimated as glucose. Indian hemp and extract of nux vomica were two extracts that appeared to him to be especially suitable for preparation in the form of powder, and he would suggest that they should be evaporated *in vacuo*, or at least partial vacuo.

Mr. F. Ransom, in reply to the questions raised, said, replying to the President, that pure brucine was not easily obtained, but there was no doubt at least that its action was in no way antagonistic to that of strychnine. He certainly looked forward to the time when they would be better able to appreciate and understand the action of alkaloids and other specific principles in drugs. Replying to Mr. McDiarmid, he would suggest that he should reduce his 15 per cent. opium with some of a lower percentage, but it was now generally conceded that the B.P. standard was too low, and it would probably be altered in the next edition. He had not found any difficulty with the oil in nux vomica. The strength of spirit now employed was adopted because it was found to be the strength which dissolved most alkaloid. He might remind Mr. Williams that Will did not rely upon the change in optical activity merely for proof of the conversion of hyoscyamine into atropine, but was led to form his opinion chiefly from an examination of the platinum and gold salts of the two bodies, and Ladenburg himself allows that the optical activity of the two is different.

Mr. Ellwood then proposed, and Mr. Fawsett seconded, a vote of thanks to Mr. Ransom for his valuable paper. The vote being carried by acclamation, and acknowledged by Mr. Ransom, the proceedings terminated.

Reviews.

OUTLINES OF QUALITATIVE ANALYSIS. By GEORGE W. SLATTER, A.R.C.Sc., F.I.C., F.C.S.*

This is an addition to our stock of text-books on the subject, which presents several features to recommend it for the use of those studying analysis, and is more especially adapted for use in schools or science classes of the South Kensington type, where the time devoted to the subject is necessarily brief, and only the principal reactions of each element can be studied.

It is very similar in arrangement and style to the well-known work of Valentin, but is much less extended, and makes use of ordinary formulæ instead of those there adopted. The principal reactions only of each metal are described, with equations to show the changes involved, and include the "dry" reactions on charcoal in the borax bead, etc., with about half-a-dozen "wet" ones. Notes in italics are inserted to call attention to the distinctive tests or to explain the reasons for certain manipulations, and attention is specially drawn to the reactions which may be made use of for separating allied metals, and those on which the separation of the metals of the same group is based.

The acids are treated in the same way as the bases, and include the principal inorganic acids, with hydrocyanic, formic, acetic, oxalic, tartaric, citric, benzoic and succinic. Instructions for the analysis of unknown substances are then given chiefly in the tabular form, and tables for the separation of the metals in each of the various groups. There are also tables "for the special case of the South Kensington syllabus in Elementary Practical Chemistry," and examples of the analysis of a supposed mixture where the somewhat complicated observation is made that on heating on platinum wire "the flame was coloured green, blue, red, and violet," and corresponding inferences were drawn as to the possible presence of $CuCl_2$, Pb, As, Sb, Ca, K.

An appendix contains tables of atomic weights, etc. and questions on the previous part of the book. At the commencement of the book are some "useful hints," which the beginner would do well to read carefully and profit by, and before actual testing is commenced a series of preliminary operations, calculated to give a slight acquaintance with some typical chemical reactions, oxidation, reduction, acidity, alkalinity, etc., are given. Although not calculated to give much insight into chemical principles, it is well adapted for giving a sufficient knowledge of the commoner tests to enable one to successfully perform an ordinary qualitative analysis, and as the tests given are few, it is especially useful where time for a fuller study of the science is not available.

The author claims that the reactions given may be relied upon, as they have been repeatedly verified; but this can scarcely be the case with respect to the assertion that arsenic compounds are reduced to arsenious by simply boiling with hydrochloric acid. This is, however, the only questionable statement we have observed in the book, with the exception of one or two obvious misprints.

INTRODUCTION À L'ÉTUDE DES DESCRIPTIVE MÉDICAMENTS NATURELS D'ORIGINE VÉGÉTALE. Par A. HERLANT.†

This little treatise is exactly what its name implies. It is an elementary work on pharmacognosy, giving a general outline of the subject, and showing the scientific basis on which this part of the art of pharmacy rests, as well as explaining the meaning of the terms employed in describing the structure and character of drugs.

* London: Thomas Murby. Crown 8vo. Pp. 1–140. 2*s.* 6*d.*

† Bruxelles. 1888. 12 pl. phot. Pp. 1-85.

Although the author does not approve of the word pharmacognosy he offers no substitute, but uses the less convenient phrase "the descriptive study of simple drugs." He considers that this should include a statement of the botanical source of drugs and of any facts relating to their cultivation, collection, preparation and commerce; a description of the part used; the chemical composition of the drug; the preparations in which it is employed; the maximum doses of active medicines; the alterations or falsifications of drugs; and the processes employed to recognize them. Nearly half the book is devoted to a series of typical drugs, which are illustrated by micro-photographs of sections. The method of classification adopted is primarily into organs of vegetation and reproduction, the former being subdivided into organs of the axis and appendicular organs. The organs of the axis include:—1, entire plants; 2, roots, rhizomes, tubercules and bulbs; 3, stem, including wood and bark; 4, buds; 5, leaves; 6, hairs and glands; 7, galls; 8, flowers and flowering tops; 9 fruits; 10, seeds.

The other half of the work is given up to the study of the proximate principles of vegetable drugs, including amylaceous substances, saccharine exudations, gums and mucilages, gum resins and latex, essential oils, resinous products, oils, fats, and waxes, pastes and extracts, such as catechu and kino and guarana. The book, if published in the English language, might be very useful for a student to read during his apprenticeship, as an introduction to such a special or detailed course of study of drugs as he must inevitably undergo before he can hope to pass his examination, or to be thoroughly equipped for the fierce competition which pharmacists have now to meet, and in which only special knowledge can avail in securing success. But it does not and cannot take the place of a detailed work on materia medica. The illustrations, of which there are twelve, are photographs, and are evidently taken from extremely thin microscopical sections. Photographs, however, can only give a general idea of the structure and will never bear looking into with a lens, many parts that are visible in an actual section being invariably blurred or indistinct in a photograph. The chief advantage of such illustrations is their cheapness, and the possibility of giving a much larger number than would be possible if engravings were used.

SKELETON NOTES UPON INORGANIC CHEMISTRY. Part I. Non-metallic Elements. By P. de P. RICKETTS, Ph.D., Professor of Assaying in the School of Mines, Columbia College, New York City, and S. H. RUSSELL, E.M.*

These notes are intended by the authors to aid the beginner in following lectures, and to teach him to study chemistry in a systematic manner. They are in the form of a note-book with the majority of the pages left blank for the student himself to fill in, but with notes on each element already filled in for him to a great extent. Thus for arsenic (which is taken among the non-metallic elements) we find already entered notes on its occurrence, preparation, properties, detection, applications and compounds, and a blank page or two left for the student to fill in with any additional notes, and the same plan is adopted with all the other non-metallic elements. We do not think that this apparent saving of a little trouble can be of any advantage to the student, but very much the reverse. One of the great advantages of taking notes consists in the greater impression left on the memory by the mere fact of copying them down, and this advantage is not gained by merely comparing the information given in a lecture with the stereotyped notes in the book. Any student who wishes to derive full benefit from a lecture should not attempt to transcribe all that the lecturer says, but should listen attentively, jotting down in a rough note-book the more important facts, figures, etc., and afterwards copy these rough notes into another book, amplifying them from memory, and using his text-book for reference on doubtful points. The time spent in this transcribing will not be wasted, and the advantage gained will be much greater than by using ready-made notes.

* New York: John Wiley and Sons; London Trübner and Co.

Obituary.

Notice has been received of the death of the following:—

On the 14th of December, Mr. Robert Silvers, Chemist and Druggist, Gaol Street, Great Yarmouth. Aged 64 years.

On the 19th of December, Mr. Samuel Hughes, Chemist and Druggist, High Street, Stourbridge. Aged 81 years.

On the 21st of December, Mr. William Coleman, Chemist and Druggist, Worcester Street, Wolverhampton. Aged 67 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

AMMONIUM CHLORIDE IN NEURALGIA.

Sir,—This may help to allay the contention regarding the antiquity of the use of NH_4Cl in neuralgia. Druit's 'Vade Mecum,' 10th ed., 1870, page 327, has "or the hydrochlorate or nitrate of ammonia if the mercury has followed syphilis, or if there is reason to suspect thickening of the bones of the skull."

Hooper's 'Vade Mecum,' 9th ed., 1874, page 374, has "Hydrochlorate of ammonia in doses of 30 grains, thrice a day, occasionally successful, especially when pain is confined to the jaws."

These quotations appeared in previous editions, which I have not at hand.

33, *Corporation Road, Carlisle.* JAMES FOSTER.

T. C. Richards and T. Jackson.—We think that the discussion of the subject in this Journal cannot be profitably carried further.

W. Johnston.—You will find the subject of your question dealt with fully upon another page.

J. A. Wheldon.—The remaining specimen is referred to *Amblystegium radicale*, var.

Nemo.—We will make some inquiries upon the subject.

J. W. Colcord.—We shall be happy to accede to your request, but the specimen you speak of has not yet come to hand

A. J. Wolstenholme.—We cannot find that any such process has yet been published.

Inquirer.—A complete list of the Subscribers and Donors to the Benevolent Fund will be found in the Calendar of the Pharmaceutical Society, the new issue of which will be published in the course of a few weeks.

J. Apsland.—The production of a declaration of having been for three years registered and employed as an apprentice or student, or having been otherwise for three years practically engaged in the translation and dispensing of prescriptions, is required as a preliminary from a candidate for the Minor examination.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Grierson, Hurst, Reynolds, Simpson, Jones.

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CHEST PROTECTORS & VESTS

FOR SHIELDING THE LUNGS.

Fig. 3.
Double, for the Chest and Back.

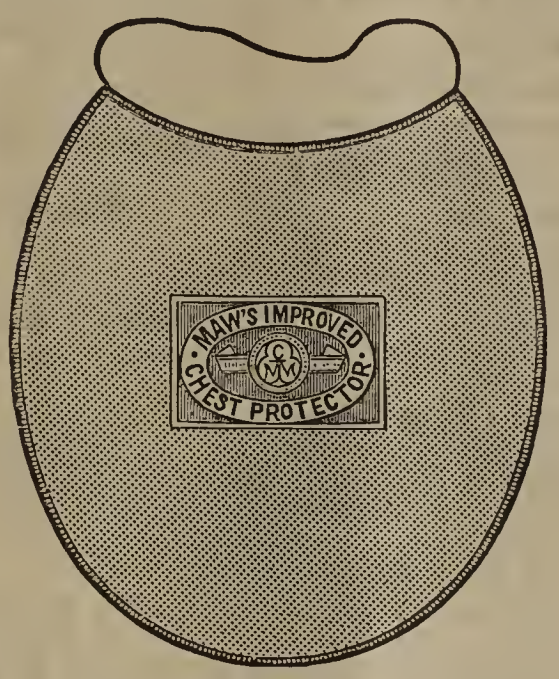

Fig. 4.
Single, Chest Protector.

Fig. 5.
Vest, a Shield for the Lungs.

CHAMOIS AND FLANNEL.

		No. 1.	No. 2.	No. 3.	No. 4.
Fig. 3. Double	per doz.	20/	26/	32/	39/
Ditto, perforated	„	24/	32/	38/	46/
Fig. 4. Single	„	9/	11/6	13/6	16/
Ditto, perforated	„	11/	14/	16/	19/
Fig. 5. Vests „	„	27/	34/	42/	51/

FELT, ASSORTED SCARLET AND WHITE.

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
Fig. 3. Double, best, per doz.	17/	22/	27/	33/	44/
Ditto, second „	14/6	19/	23/	28/	37/
Fig. 4. Single, best „	7/6	9/6	11/	14/	20/
Ditto, second „	6/6	8/	9/6	12/	16/
Fig. 5. Vests, Scarlet „	17/	22/	27/	33/	40/

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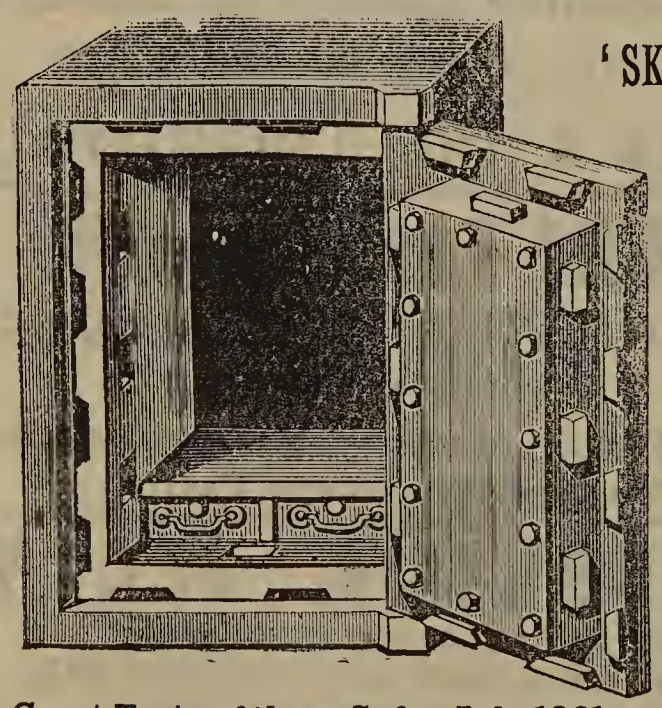

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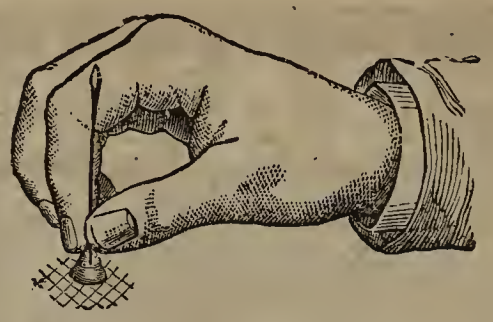

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PASS LIST FOR OCTOBER.

MINOR.

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„ F. W. Jackson	Blackpool.
„ J. M. Jones	Conway.
„ C. G. McGibbon	Liverpool.
„ G. H. Nicol	Dumfries.
„ C. F. Parker	Liverpool.
„ E. H. Rogers	London.
„ W. A. Roberts	Bangor.

In July Seven passed the Minor from the Liverpool School, **making a Total of Fifteen for the Two Examinations.**

The next full Course of Lectures will commence on **Tuesday, January 1st, 1889,** and those intending to join this course are requested to send in their names as early as possible, so as to secure benches, as it is fully expected that, **notwithstanding the increased accommodation,** the classes will be quite full.

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At the December Examinations **Eight** Students from this School passed the Minor, viz.:—

Mr. T. Asbury.	Mr. J. Gardner.
„ L. Lee.	„ J. H. Brackenbury.
„ C. P. Tomlinson.	„ S. Lupton.
„ W. Turver.	„ J. H. Franklin.

Making a total of **46** Minors who have passed from the M. C. P. at the seven Examinations of the year now ending.

Two Majors also passed at this month's Examinations, viz.:—

Mr. W. Hampson.	Mr. A. H. Barlow.

The next Session will begin on January 1st.

Full particulars of Mr. Turner's system of **thorough** instruction by **class work** will be sent on application.

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(Council Medallist of the Pharmaceutical Society)
Receives a few Pupils for the above Examinations.

Convenient **LABORATORY** open daily for instruction in ANALYTICAL CHEMISTRY.

At the October Examination 7 of my pupils presented themselves—5 passed. In December 3 only presented themselves—**ALL** passed. Intending Students should note the very high percentage of successes, and enter their names early for the January term (January 7th), as only a very limited number can be taken.

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(from the Royal School of Mines),
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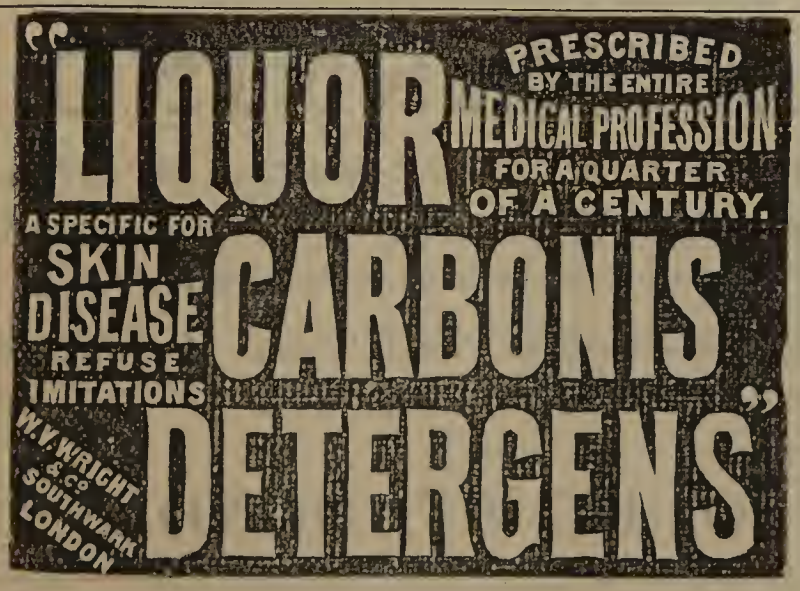

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